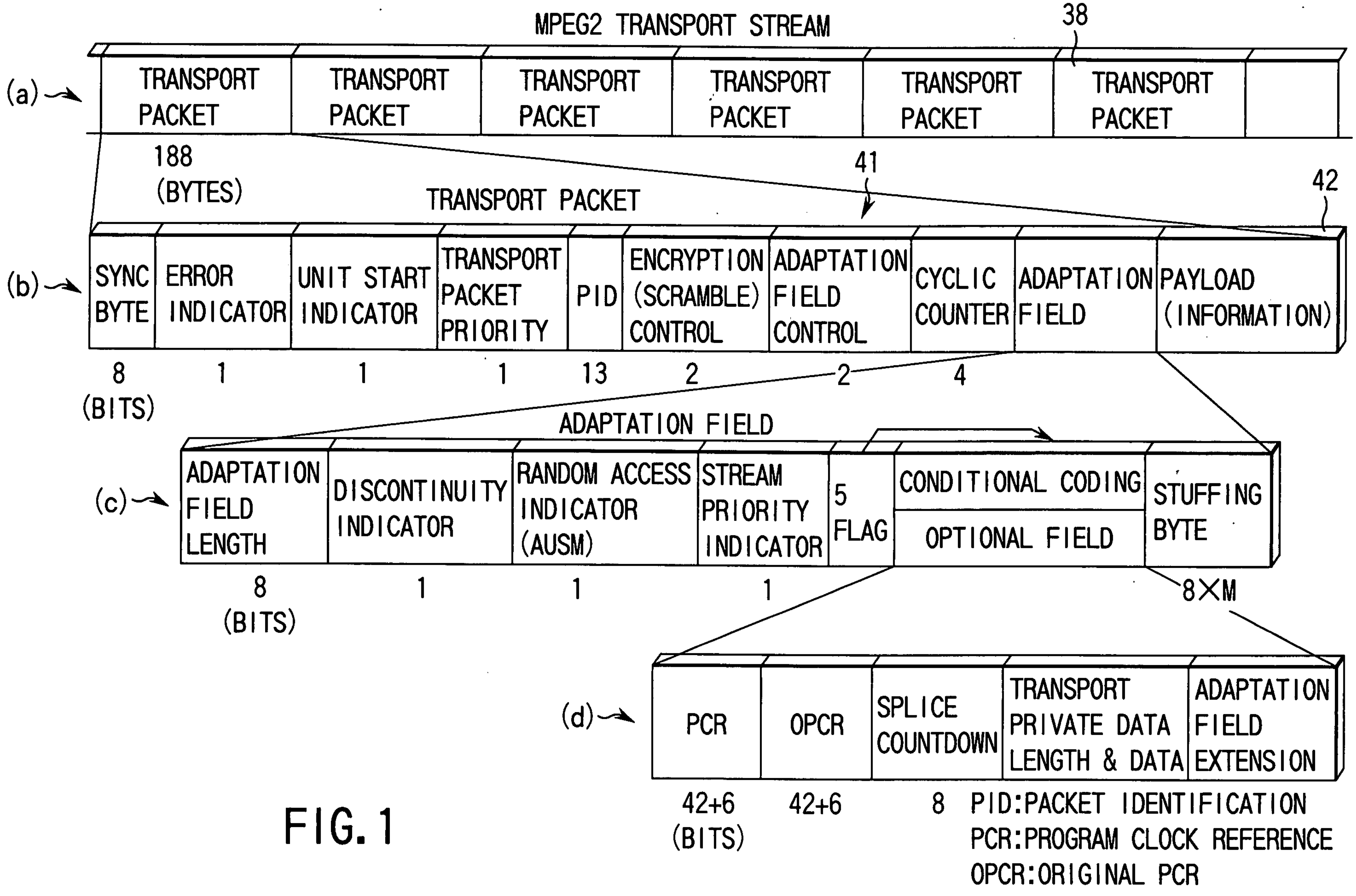
OBLON ET AL (703) 413-3000
DOCKET # 0039-7513-2S SHEET 1 OF 30



MPEG2 TRANSPORT STREAM
38
(a)
TRANSPORT PACKET
TRANSPORT PACKET
TRANSPORT PACKET
TRANSPORT PACKET
TRANSPORT PACKET
TRANSPORT PACKET
188 (BYTES)
TRANSPORT PACKET
41
42
(b)
SYNC BYTE
ERROR INDICATOR
UNIT START INDICATOR
TRANSPORT PACKET PRIORITY
PID
ENCRYPTION (SCRAMBLE) CONTROL
ADAPTATION FIELD CONTROL
CYCLIC COUNTER
ADAPTATION FIELD
PAYLOAD (INFORMATION)
8 (BITS)
1
1
1
13
2
2
4
ADAPTATION FIELD
(c)
ADAPTATION FIELD LENGTH
DISCONTINUITY INDICATOR
RANDOM ACCESS INDICATOR (AUSM)
STREAM PRIORITY INDICATOR
5 FLAG
CONDITIONAL CODING
OPTIONAL FIELD
STUFFING BYTE
8 (BITS)
1
1
1
8×M
(d)
PCR
OPCR
SPLICE COUNTDOWN
TRANSPORT PRIVATE DATA LENGTH & DATA
ADAPTATION FIELD EXTENSION
42+6 (BITS)
42+6
8

PID:PACKET IDENTIFICATION
PCR:PROGRAM CLOCK REFERENCE
OPCR:ORIGINAL PCR

FIG. 1

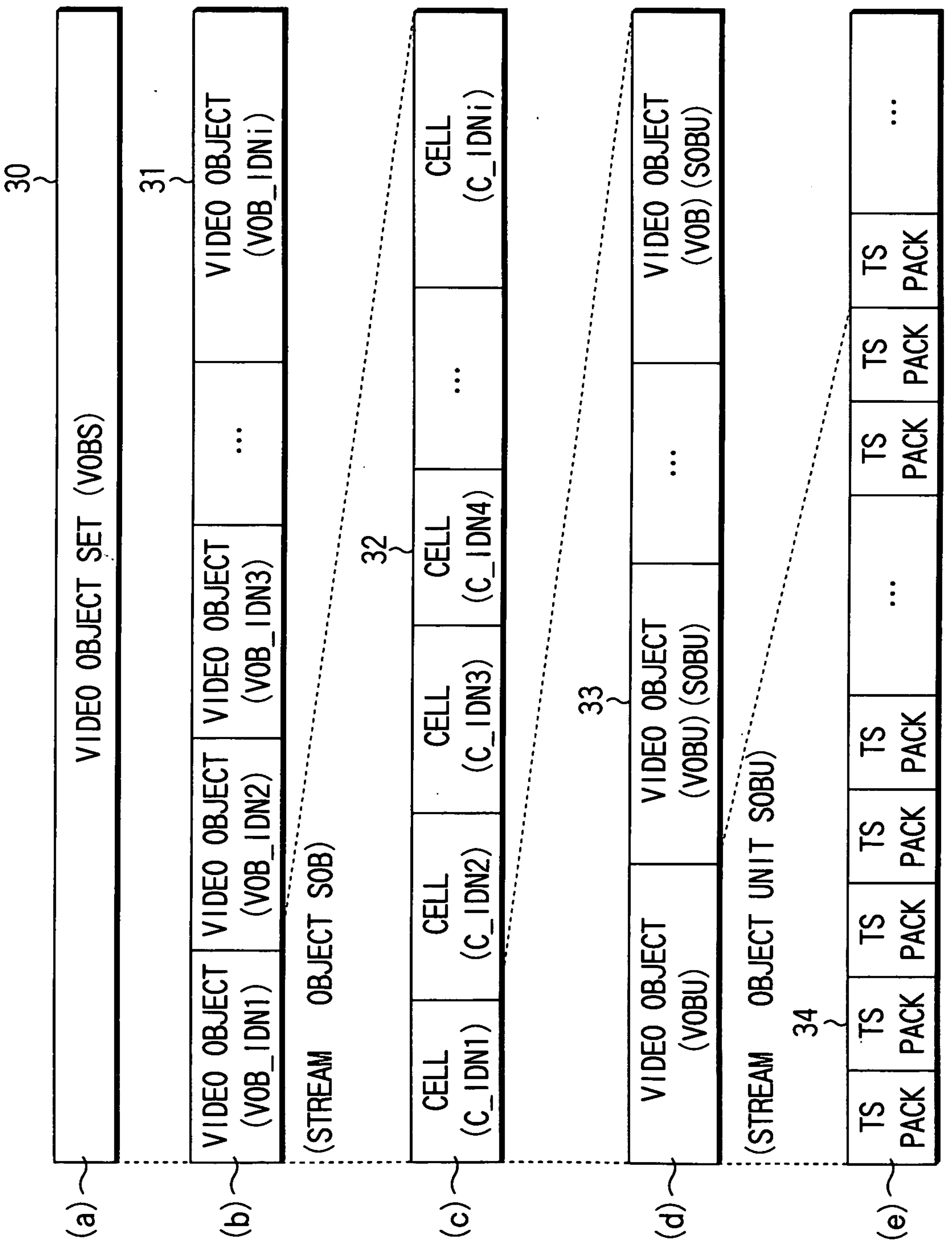

(a)
30
VIDEO OBJECT SET (VOBS)
(b)
31
VIDEO OBJECT (VOB_IDN1)
VIDEO OBJECT (VOB_IDN2)
VIDEO OBJECT (VOB_IDN3)
...
VIDEO OBJECT (VOB_IDNi)
(STREAM OBJECT SOB)
(c)
32
CELL (C_IDN1)
CELL (C_IDN2)
CELL (C_IDN3)
CELL (C_IDN4)
...
CELL (C_IDNi)
(d)
33
VIDEO OBJECT (VOBU)
VIDEO OBJECT (VOBU) (SOBU)
...
VIDEO OBJECT (VOB) (SOBU)
(STREAM OBJECT UNIT SOBU)
(e)
34
TS PACK
TS PACK
TS PACK
TS PACK
TS PACK
...
TS PACK
TS PACK
TS PACK
...

FIG.2

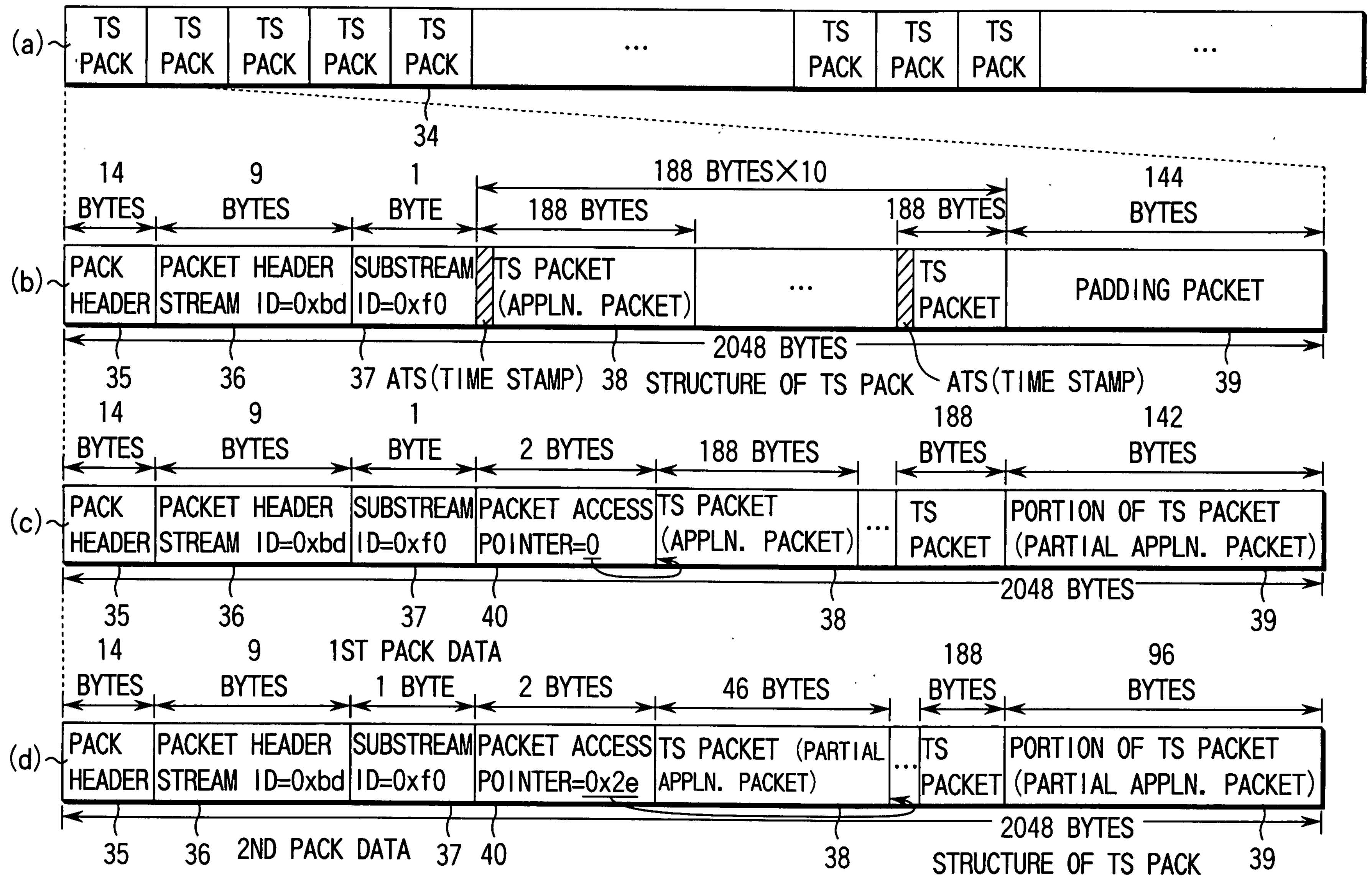
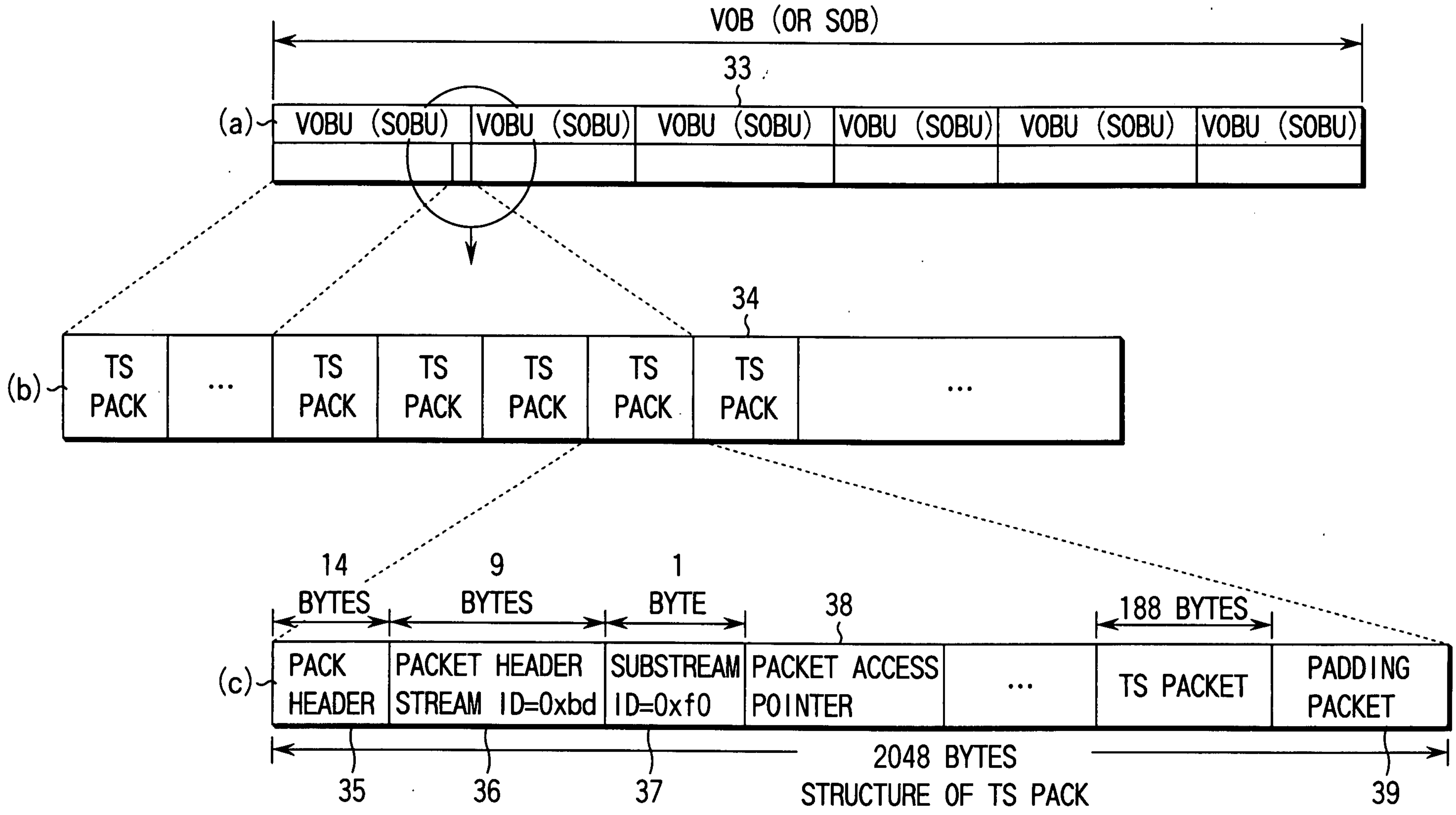

(a)
TS PACK
TS PACK
TS PACK
TS PACK
TS PACK
...
TS PACK
TS PACK
TS PACK
...
34
(b)
14 BYTES
9 BYTES
1 BYTE
188 BYTES×10
188 BYTES
188 BYTES
144 BYTES
PACK HEADER
PACKET HEADER STREAM ID=0xbd
SUBSTREAM ID=0xf0
TS PACKET (APPLN. PACKET)
...
TS PACKET
PADDING PACKET
2048 BYTES
35
36
37 ATS(TIME STAMP)
38
STRUCTURE OF TS PACK
ATS(TIME STAMP)
39
(c)
14 BYTES
9 BYTES
1 BYTE
2 BYTES
188 BYTES
188 BYTES
142 BYTES
PACK HEADER
PACKET HEADER STREAM ID=0xbd
SUBSTREAM ID=0xf0
PACKET ACCESS POINTER=0
TS PACKET (APPLN. PACKET)
...
TS PACKET
PORTION OF TS PACKET (PARTIAL APPLN. PACKET)
2048 BYTES
35
36
37
40
38
39
1ST PACK DATA
(d)
14 BYTES
9 BYTES
1 BYTE
2 BYTES
46 BYTES
188 BYTES
96 BYTES
PACK HEADER
PACKET HEADER STREAM ID=0xbd
SUBSTREAM ID=0xf0
PACKET ACCESS POINTER=0x2e
TS PACKET (PARTIAL APPLN. PACKET)
...
TS PACKET
PORTION OF TS PACKET (PARTIAL APPLN. PACKET)
2048 BYTES
35
36
2ND PACK DATA
37
40
38
STRUCTURE OF TS PACK
39

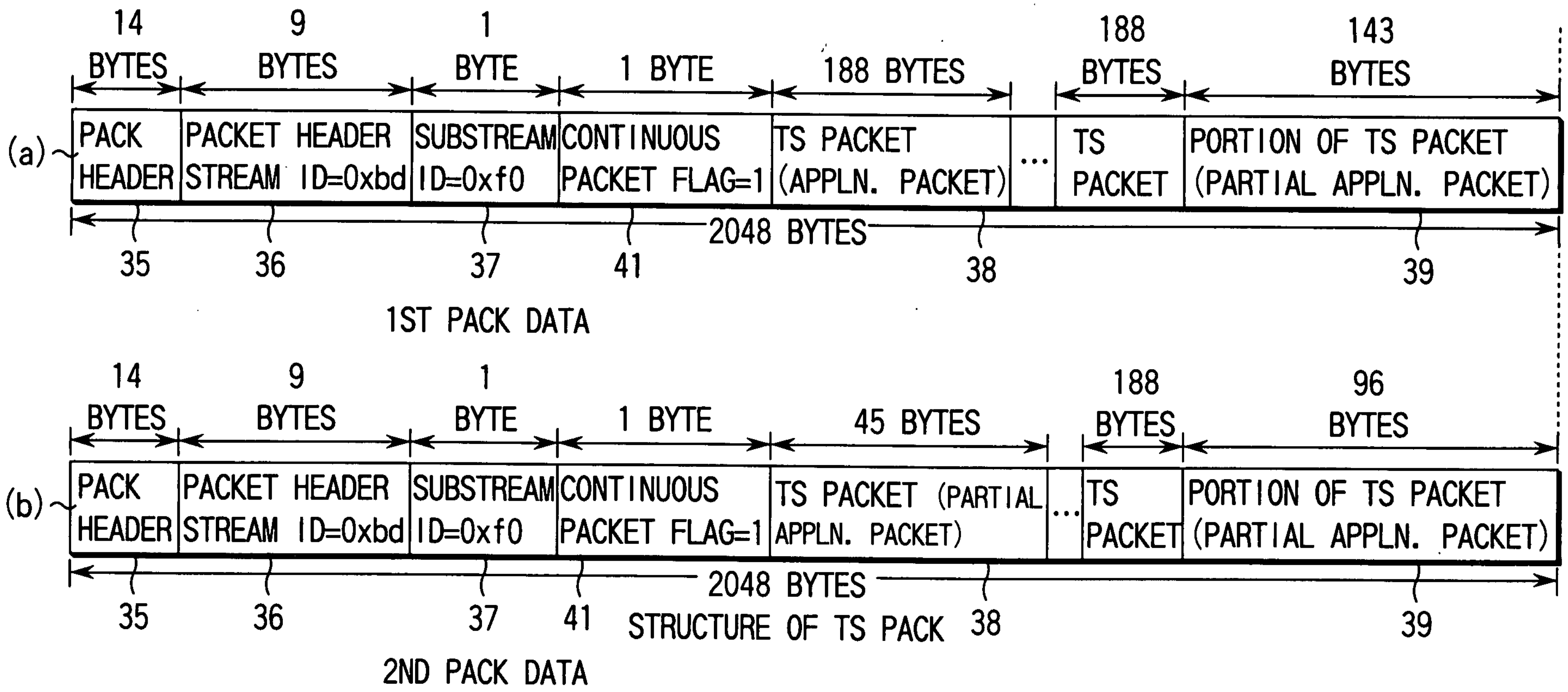
FIG. 3


VOB (OR SOB)
33
(a)
VOBU (SOBU)
VOBU (SOBU)
VOBU (SOBU)
VOBU (SOBU)
VOBU (SOBU)
VOBU (SOBU)
34
(b)
TS PACK
...
TS PACK
TS PACK
TS PACK
TS PACK
TS PACK
...
14 BYTES
9 BYTES
1 BYTE
38
188 BYTES
(c)
PACK HEADER
PACKET HEADER STREAM ID=0xbd
SUBSTREAM ID=0xf0
PACKET ACCESS POINTER
...
TS PACKET
PADDING PACKET
2048 BYTES
35
36
37
39

STRUCTURE OF TS PACK

FIG. 4

00ETT0" S8028h60


(a)
14 BYTES
9 BYTES
1 BYTE
1 BYTE
188 BYTES
188 BYTES
143 BYTES
PACK HEADER
PACKET HEADER STREAM ID=0xbd
SUBSTREAM ID=0xf0
CONTINUOUS PACKET FLAG=1
TS PACKET (APPLN. PACKET)
...
TS PACKET
PORTION OF TS PACKET (PARTIAL APPLN. PACKET)
2048 BYTES
35
36
37
41
38
39
(b)
14 BYTES
9 BYTES
1 BYTE
1 BYTE
45 BYTES
188 BYTES
96 BYTES
PACK HEADER
PACKET HEADER STREAM ID=0xbd
SUBSTREAM ID=0xf0
CONTINUOUS PACKET FLAG=1
TS PACKET (PARTIAL APPLN. PACKET)
...
TS PACKET
PORTION OF TS PACKET (PARTIAL APPLN. PACKET)
2048 BYTES
35
36
37
41
38
39

1ST PACK DATA

STRUCTURE OF TS PACK

2ND PACK DATA

IF CONTINUOUS PACKET FLAG=1, TS PACKET EXTENDS ACROSS NEXT PACK (FROM 39 OF (a) TO 38 OF (b))

FIG. 5

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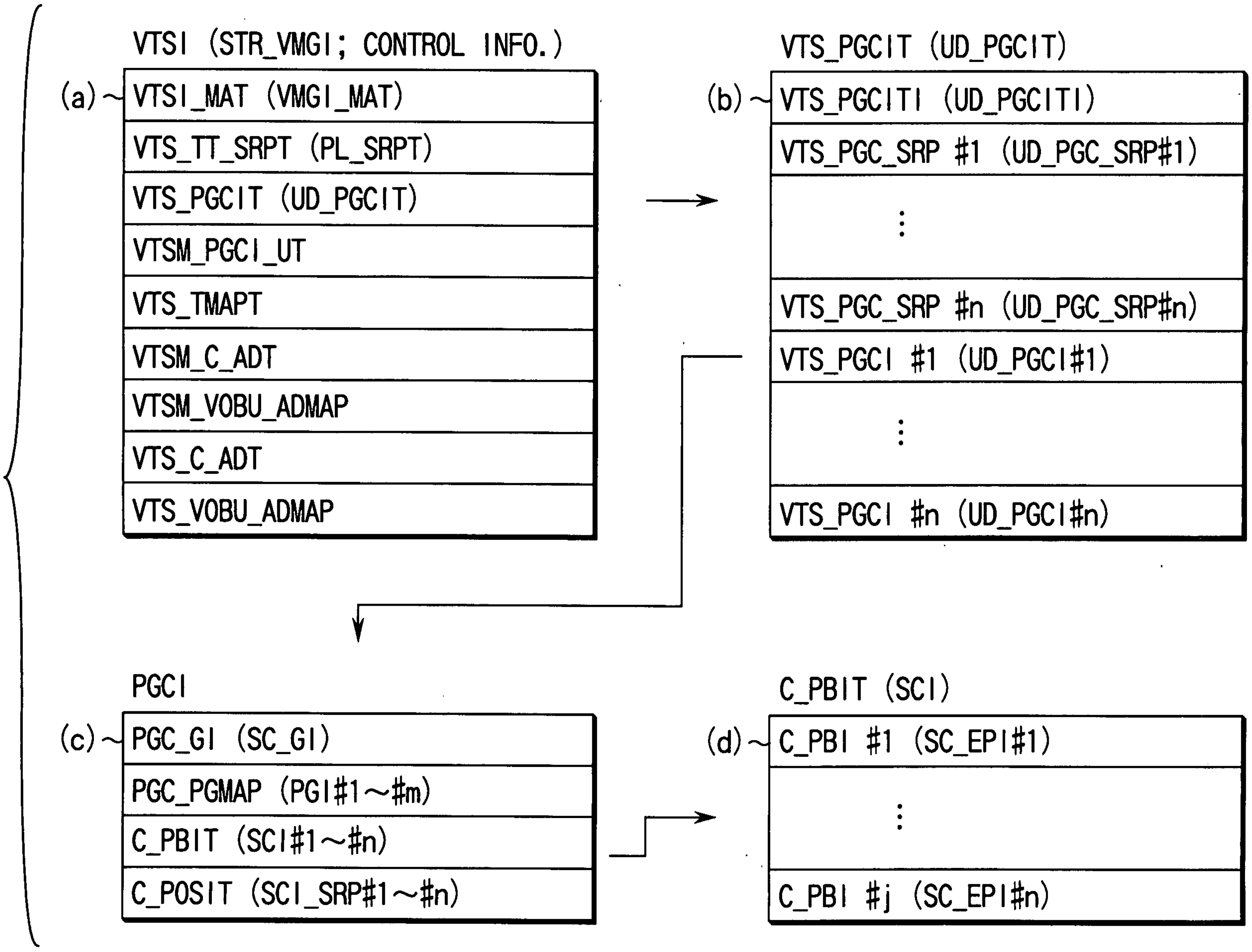
FIG. 6


VTSI (STR_VMGI; CONTROL INFO.)
(a)
VTSI_MAT (VMGI_MAT)
VTS_TT_SRPT (PL_SRPT)
VTS_PGCIT (UD_PGCIT)
VTSM_PGCI_UT
VTS_TMAPT
VTSM_C_ADT
VTSM_VOBU_ADMAP
VTS_C_ADT
VTS_VOBU_ADMAP
VTS_PGCIT (UD_PGCIT)
(b)
VTS_PGCITI (UD_PGCITI)
VTS_PGC_SRP #1 (UD_PGC_SRP#1)
⋮
VTS_PGC_SRP #n (UD_PGC_SRP#n)
VTS_PGCI #1 (UD_PGCI#1)
⋮
VTS_PGCI #n (UD_PGCI#n)
PGCI
(c)
PGC_GI (SC_GI)
PGC_PGMAP (PGI#1～#m)
C_PBIT (SCI#1～#n)
C_POSIT (SCI_SRP#1～#n)
C_PBIT (SCI)
(d)
C_PBI #1 (SC_EPI#1)
⋮
C_PBI #j (SC_EPI#n)

PGC_GI (SC_GI)

(a)

| | CONTENTS |
|---|---|
| PGC_CNT | NUMBER OF PROGRAMS, NUMBER OF CELLS |
| PGC_TRS_TM | RECORDING TIME PER PGC |
| SUPPORT INFO | SUPPORT INFORMATION (DETAILS ARE LISTED BELOW) |
| PGC_PGMAP_SA | START ADDRESS OF PROGRAM MAP |
| C_PBIT_SA | START ADDRESS OF C_PBIT |
| C_POSIT_SA | START ADDRESS OF C_POSIT |
| ARCHIVE FLAG (C_TY1 & TE) | ERASE INHIBITION FLAG<br>0: FREE, 1: SAVE PERMANENTLY |
| SC_EPI_Ns | NUMBER OF ENTRY POINT INFORMATION |
| SOB_N | STREAM OBJECT NUMBER |
| SC_S_APAT | STREAM CELL START APAT |
| SC_E_APAT | STREAM CELL END APAT |
| if (TE=='10b') { | |
| ERA_S_APAT | ERASE START APAT |
| ERA_E_APAT | ERASE END APAT |

(b)

| b7 b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|
| IDENTIFICATION CODE OF STB THAT RECORDED DATA | SCD SUPPORT | PCR SUPPORT | PAT, PMT SUPPORT | UNIT START INDICATOR SUPPORT | RANDOM ACCESS INDICATOR SUPPORT |

RANDOM ACCESS INDICATOR SUPPORT FLAG
0b···NOT SUPPORTED,
1b···SUPPORTED
UNIT START INDICATOR SUPPORT FLAG
0b···NOT SUPPORTED,
1b···SUPPORTED
PAT, PMT SUPPORT FLAG
0b···NOT SUPPORTED,
1b···SUPPORTED
PCR SUPPORT FLAG
0b···NOT SUPPORTED,
1b···SUPPORTED
SCD SUPPORT FLAG
0b···NOT SUPPORTED,
1b···SUPPORTED
PCR=PRESENTATION CLOCK REFERENCE
SCD=SPLICE COUNTDOWN

STB IDENTIFICATION CODE
001:STB OF BS DIGITAL BROADCAST
010:Ver2 STB OF DirecTV
011:Ver1 STB OF SKY PERFECT TV
C_TY1···'010b' SHALL BE DESCRIBED FOR ALL STREAM CELLS
TE···'00b':THIS CELL IS IN THE "NORMAL" STATE
'01b':THIS CELL IS IN "TEMPORARILY ERASED" STATE; AND THIS CELL STARTS AFTER THE FIRST APPLICATION PACKET OF A SOBU AND ENDS BEFORE THE LAST APPLICATION PACKET OF THE SAME SOBU
'10b':THIS CELL IS IN "TEMPORARILY ERASED" STATE; AND THIS CELL CONTAINS AT LEAST ONE SOBU BORDER (FIRST OR LAST APPLICATION PACKET OF A SOBU). ERA_S_APAT AND ERA_E_APAT EXIT FOR THIS CELL

FIG. 7

C_PBI (SCI)

| RBP | | CONTENTS | NUMBER OF BYTES |
|---|---|---|---|
| 0 TO 0 | C_CAT (C_TY) | CELL TYPE 02: STREAMER CELL | |
| 1 TO 4 | C_ARLTM | STC VALUE OR PCR UPON RECORDING HEAD OF CELL OF INTEREST | |
| 5 TO 8 | C_FVOBU_SA | START ADDRESS OF CELL | |
| 9 TO 12 | C_LVOBU_SA | START ADDRESS OF LAST VOBU OF CELL | |
| 13 TO 16 | C_LVOBU_EA | END ADDRESS OF LAST VOBU OF CELL | |
| 17 TO 18 | TS PACKET LENGTH | TS PACKET LENGTH: NORMAL: 0xbc | |
| 19 TO 22 | REFPIC_Ns (AU_Ns) | NUMBER OF I-PICTURES | |
| 23 TO 26 | REFPIC_SA_#1 (AUSM) | START ADDRESS OF I-PICTURE #1 | |
| 27 TO 30 | REFPIC_EA_#1 (AUEM) | END ADDRESS OF I-PICTURE #1 | |
| | ⋮ | | |
| 23+(n-1)×8 | REFPIC_SA_#n (AUSM) | START ADDRESS OF I-PICTURE #n | |
| 27+(n-1)×8 | REFPIC_EA_#n (AUEM) | END ADDRESS OF I-PICTURE #n | |
| | | TOTAL | 30+(n-1)×8 |

AUD

REFPIC_Ns: NUMBER OF I-PICTURES ("0" IF NO RANDOM ACCESS INDICATOR IS AVAILABLE)
REFPIC_SA#n: ADDRESS OF TS PACK INCLUDING FIRST TS PACKET OF I-PICTURE #n
(TS PACK WITH ACTIVE RANDOM ACCESS INDICATOR)
REFPIC_EA#n: ADDRESS OF TS PACK INCLUDING LAST TS PACKET OF I-PICTURE #n
(TS PACK WITH ACTIVE UNIT START INDICATOR)
("0" IF NO UNIT START INDICATOR IS AVAILABLE)

FIG.8

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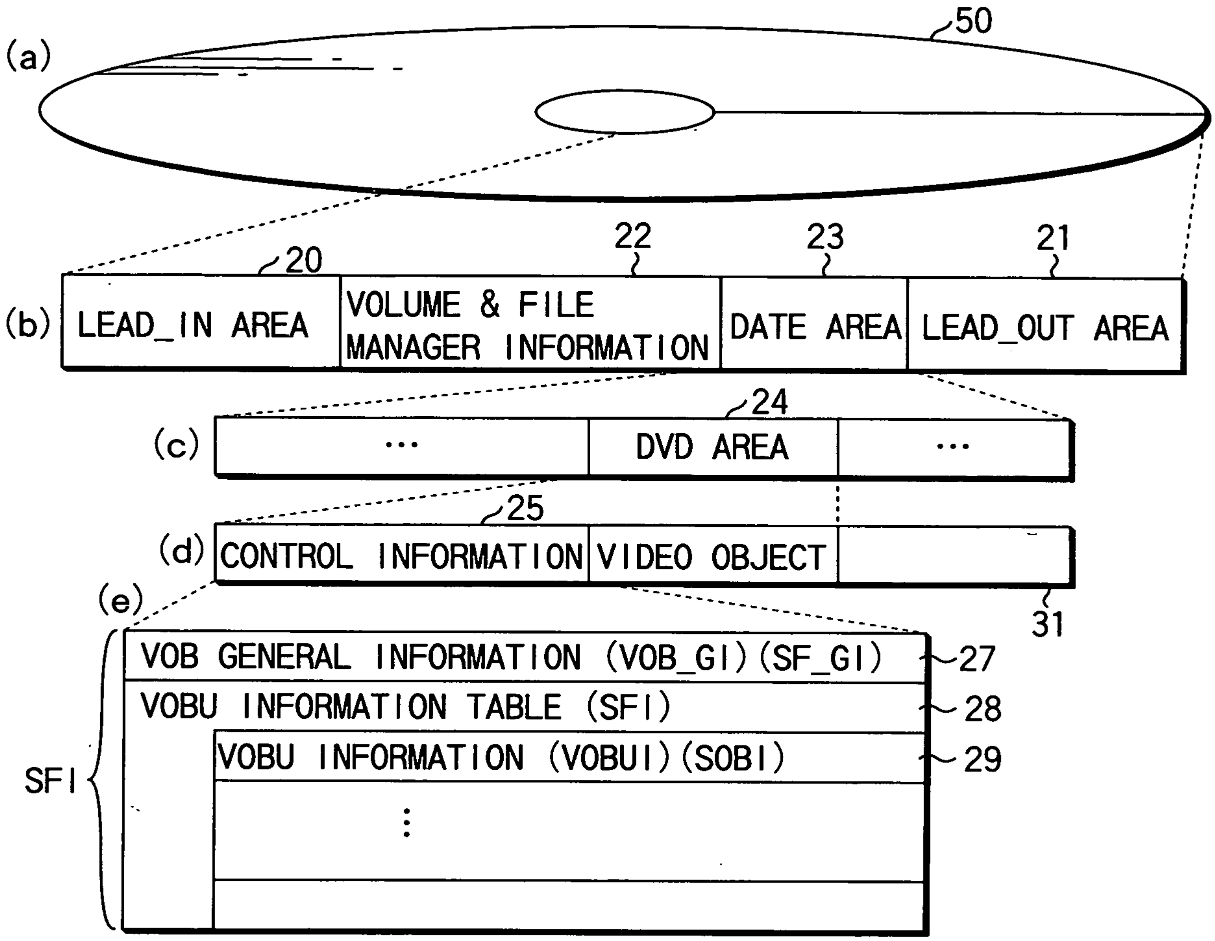
(a)
50
(b)
20
LEAD_IN AREA
22
VOLUME & FILE MANAGER INFORMATION
23
DATE AREA
21
LEAD_OUT AREA
(c)
...
24
DVD AREA
...
(d)
25
CONTROL INFORMATION
VIDEO OBJECT
31
(e)
VOB GENERAL INFORMATION (VOB_GI)(SF_GI)
27
VOBU INFORMATION TABLE (SFI)
28
VOBU INFORMATION (VOBUI)(SOBI)
29
SFI

(f) VOB_GI (SF_GI)

| RBP | | CONTENTS | NUMBER OF BYTES |
|---|---|---|---|
| 0 TO 3 | VOBU_Ns<br>(SOBI_Ns) | NUMBER OF VOBUs<br>(NUMBER OF SOBIs) | 4 BYTES |
| 4 TO 7 | VOBI_END ADDRESS (OR LENGTH)<br>(SOBU_SIZ) | END ADDRESS OR LENGTH OF VOBI<br>(NUMBER OF SECTORS PER SOBU) | 4 BYTES |
| 8 TO 8 | SUPPORT INFO | SUPPORT INFORMATION | 1 BYTE |
| 9 TO 9 | ARCHIVE FLAG | ERASURE INHIBITION FLAG<br>0: FREE, 1: SAVE PERMANENTLY | 1 BYTE |
| | | TOTAL | 19 BYTES |

FIG. 9

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VOBUI (SOBI)

| RBP | | CONTENTS | NUMBER OF BYTES |
|---|---|---|---|
| 0 TO 3 | VOBU START ADDRESS | START ADDRESS OF VOBU | |
| 4 TO 7 | VOBU END ADDRESS (OR LENGTH) | END ADDRESS OR LENGTH OF VOBU | |
| 8 TO 11 | VOBU_RECTM | STC VALUE OR PCR UPON RECORDING HEAD OF VOBU OF INTEREST | |
| 12 TO 13 | TS PACKET LENGTH | TS PACKET LENGTH: NORMAL: 0xbc | |
| 14 TO 17 | REFPIC_Ns (AU_Ns) | NUMBER OF I-PICTURES | |
| 18 TO 21 | REFPIC_SA_#1 (AUSM) | START ADDRESS OF I-PICTURE #1 | |
| 22 TO 25 | REFPIC_EA_#1 (AUEM) | END ADDRESS OF I-PICTURE #1 | |
| | ⋮ | | |
| 16+(n-1)×8 | REFPIC_SA_#n (AUSM) | START ADDRESS OF I-PICTURE #n | |
| 20+(n-1)×8 | REFPIC_EA_#n (AUEM) | END ADDRESS OF I-PICTURE #n | |
| | | TOTAL | 25+(n-1)×8 |

AUD

REFPIC_Ns: NUMBER OF I-PICTURES ("0" IF NO RANDOM ACCESS INDICATOR IS AVAILABLE)

REFPIC_SA#n: ADDRESS OF TS PACK INCLUDING FIRST TS PACKET OF I-PICTURE #n
(TS PACK WITH ACTIVE RANDOM ACCESS INDICATOR)

REFPIC_EA#n: ADDRESS OF TS PACK INCLUDING LAST TS PACKET OF I-PICTURE #n
(TS PACK WITH ACTIVE UNIT START INDICATOR)
("0" IF NO UNIT START INDICATOR IS AVAILABLE)

FIG. 10

FIG. 11

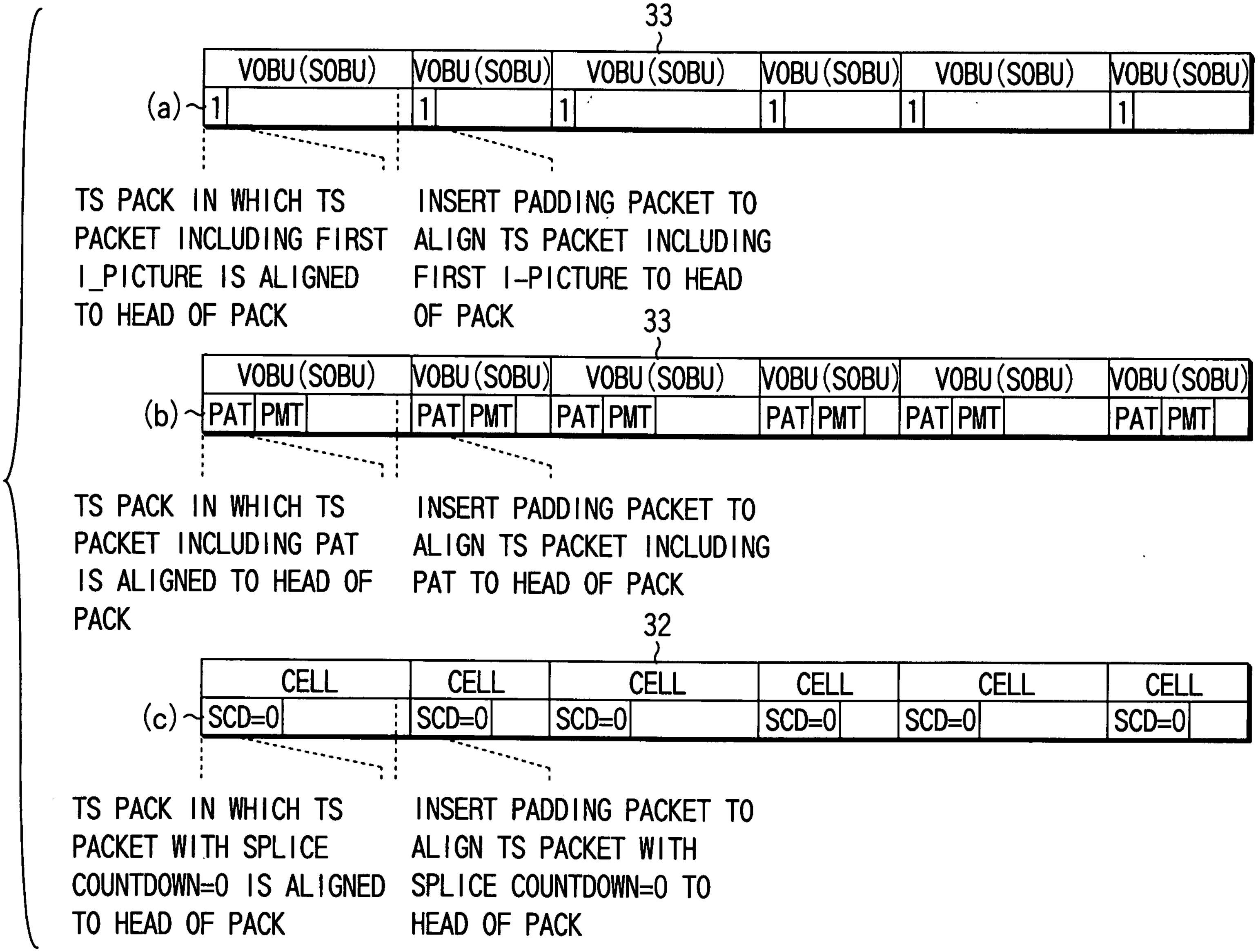
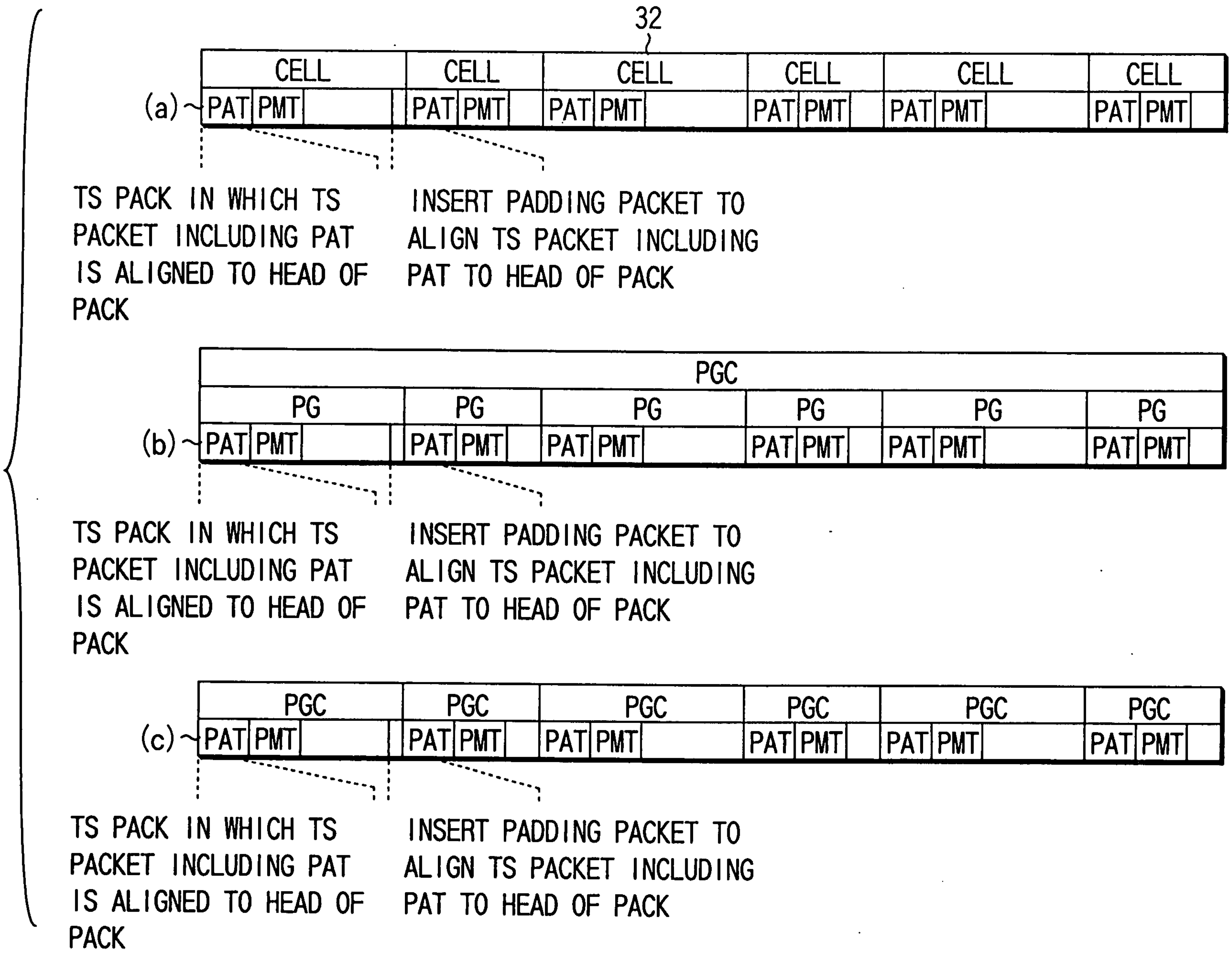

33
VOBU(SOBU)
(a)
1
TS PACK IN WHICH TS PACKET INCLUDING FIRST I_PICTURE IS ALIGNED TO HEAD OF PACK
INSERT PADDING PACKET TO ALIGN TS PACKET INCLUDING FIRST I-PICTURE TO HEAD OF PACK
33
(b)
PAT
PMT
TS PACK IN WHICH TS PACKET INCLUDING PAT IS ALIGNED TO HEAD OF PACK
INSERT PADDING PACKET TO ALIGN TS PACKET INCLUDING PAT TO HEAD OF PACK
32
CELL
(c)
SCD=0
TS PACK IN WHICH TS PACKET WITH SPLICE COUNTDOWN=0 IS ALIGNED TO HEAD OF PACK
INSERT PADDING PACKET TO ALIGN TS PACKET WITH SPLICE COUNTDOWN=0 TO HEAD OF PACK

FIG. 12



TS PACK IN WHICH TS PACKET INCLUDING PAT IS ALIGNED TO HEAD OF PACK

INSERT PADDING PACKET TO ALIGN TS PACKET INCLUDING PAT TO HEAD OF PACK

TS PACK IN WHICH TS PACKET INCLUDING PAT IS ALIGNED TO HEAD OF PACK

INSERT PADDING PACKET TO ALIGN TS PACKET INCLUDING PAT TO HEAD OF PACK

TS PACK IN WHICH TS PACKET INCLUDING PAT IS ALIGNED TO HEAD OF PACK

INSERT PADDING PACKET TO ALIGN TS PACKET INCLUDING PAT TO HEAD OF PACK

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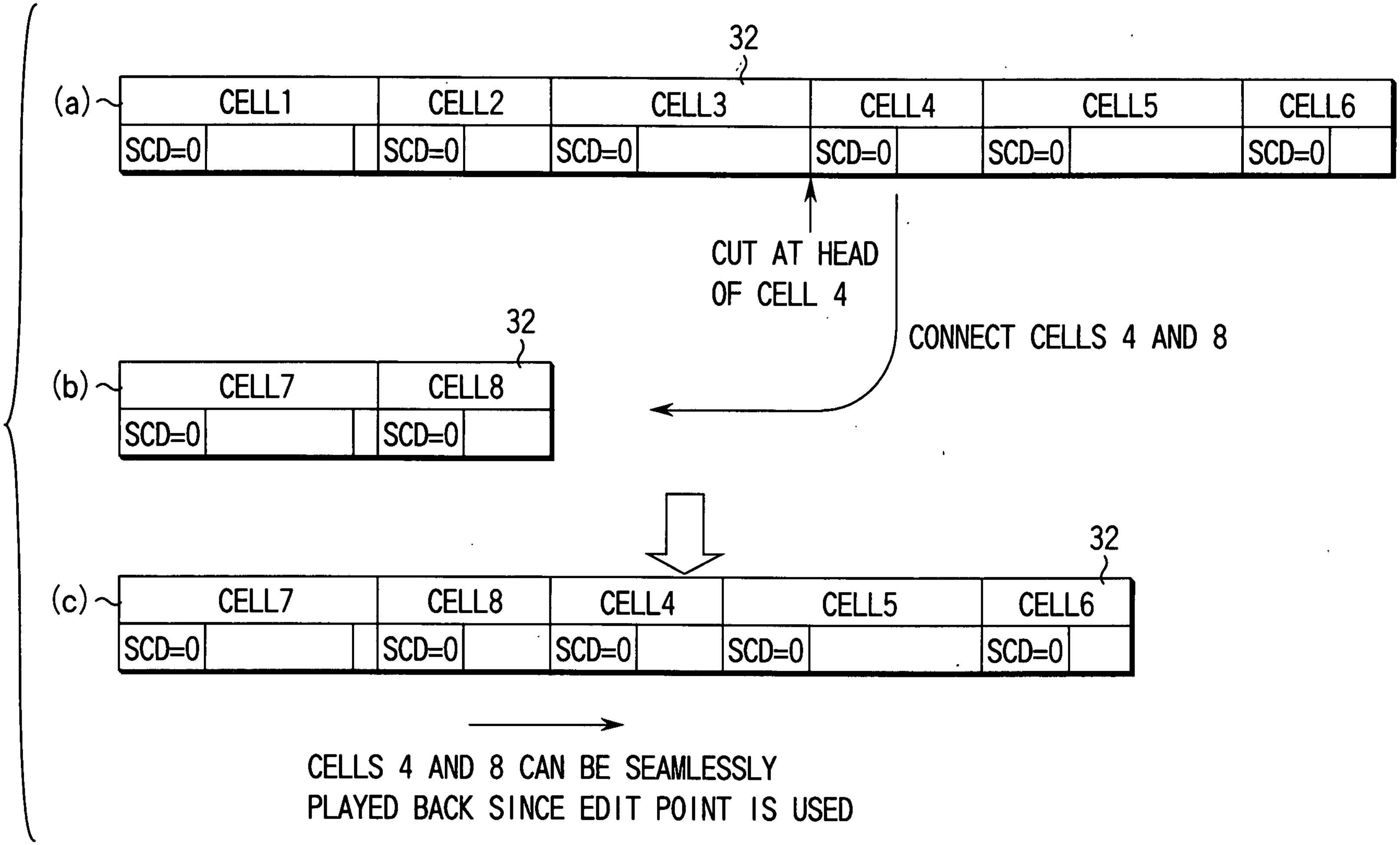
(a)
CELL1
CELL2
CELL3
CELL4
CELL5
CELL6
SCD=0
SCD=0
SCD=0
SCD=0
SCD=0
SCD=0
32
CUT AT HEAD OF CELL 4
CONNECT CELLS 4 AND 8
(b)
CELL7
CELL8
SCD=0
SCD=0
32
(c)
CELL7
CELL8
CELL4
CELL5
CELL6
SCD=0
SCD=0
SCD=0
SCD=0
SCD=0
32

CELLS 4 AND 8 CAN BE SEAMLESSLY PLAYED BACK SINCE EDIT POINT IS USED

FIG. 13

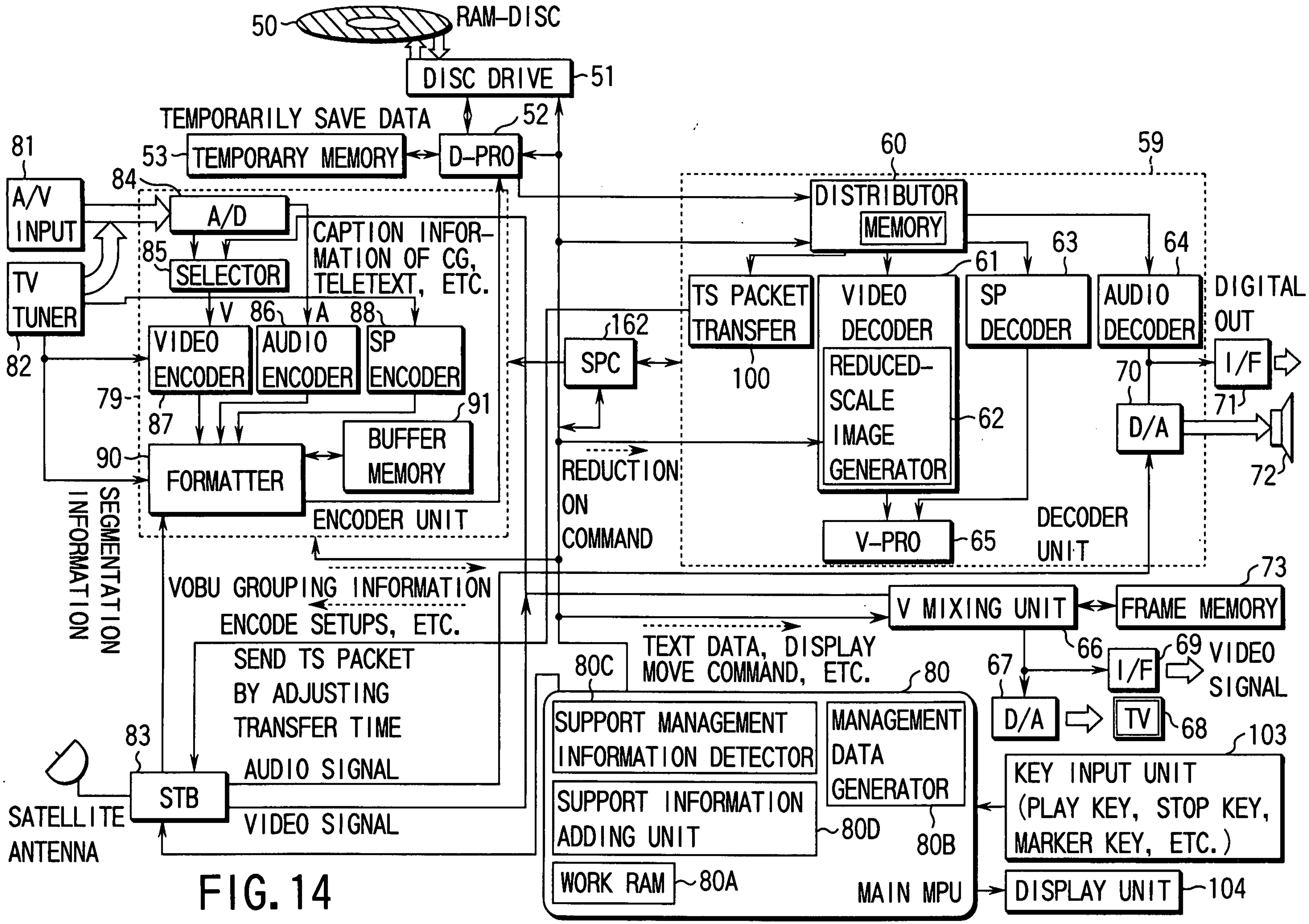
50
RAM-DISC
DISC DRIVE
51
52
TEMPORARILY SAVE DATA
53
TEMPORARY MEMORY
D-PRO
81
A/V INPUT
84
A/D
85
SELECTOR
TV TUNER
82
CAPTION INFORMATION OF CG, TELETEXT, ETC.
V
86
A
88
VIDEO ENCODER
AUDIO ENCODER
SP ENCODER
79
87
91
BUFFER MEMORY
90
FORMATTER
ENCODER UNIT
SEGMENTATION INFORMATION
VOBU GROUPING INFORMATION
ENCODE SETUPS, ETC.
SEND TS PACKET BY ADJUSTING TRANSFER TIME
AUDIO SIGNAL
VIDEO SIGNAL
83
STB
SATELLITE ANTENNA
162
SPC
REDUCTION ON COMMAND
60
59
DISTRIBUTOR
MEMORY
61
63
64
TS PACKET TRANSFER
100
VIDEO DECODER
REDUCED-SCALE IMAGE GENERATOR
62
SP DECODER
AUDIO DECODER
DIGITAL OUT
70
I/F
71
D/A
72
V-PRO
65
DECODER UNIT
73
V MIXING UNIT
FRAME MEMORY
66
TEXT DATA, DISPLAY MOVE COMMAND, ETC.
80C
80
67
I/F
69
VIDEO SIGNAL
D/A
TV
68
SUPPORT MANAGEMENT INFORMATION DETECTOR
MANAGEMENT DATA GENERATOR
SUPPORT INFORMATION ADDING UNIT
80D
80B
WORK RAM
80A
MAIN MPU
103
KEY INPUT UNIT (PLAY KEY, STOP KEY, MARKER KEY, ETC.)
DISPLAY UNIT
104

FIG. 14

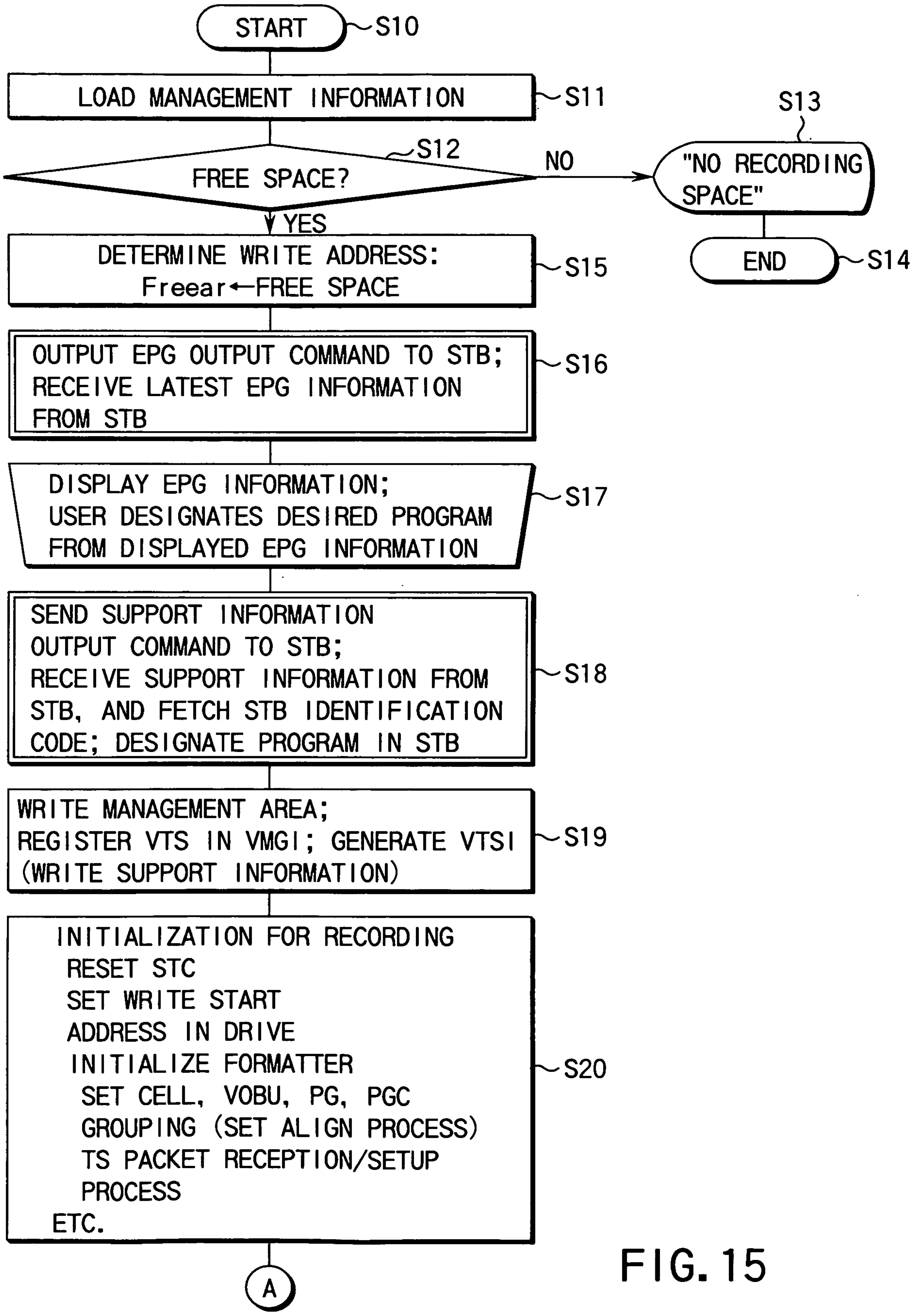
START
S10
LOAD MANAGEMENT INFORMATION
S11
FREE SPACE?
S12
NO
YES
"NO RECORDING SPACE"
S13
END
S14
DETERMINE WRITE ADDRESS: Freear←FREE SPACE
S15
OUTPUT EPG OUTPUT COMMAND TO STB; RECEIVE LATEST EPG INFORMATION FROM STB
S16
DISPLAY EPG INFORMATION; USER DESIGNATES DESIRED PROGRAM FROM DISPLAYED EPG INFORMATION
S17
SEND SUPPORT INFORMATION OUTPUT COMMAND TO STB; RECEIVE SUPPORT INFORMATION FROM STB, AND FETCH STB IDENTIFICATION CODE; DESIGNATE PROGRAM IN STB
S18
WRITE MANAGEMENT AREA; REGISTER VTS IN VMGI; GENERATE VTSI (WRITE SUPPORT INFORMATION)
S19
INITIALIZATION FOR RECORDING
RESET STC
SET WRITE START ADDRESS IN DRIVE
INITIALIZE FORMATTER
SET CELL, VOBU, PG, PGC GROUPING (SET ALIGN PROCESS)
TS PACKET RECEPTION/SETUP PROCESS
ETC.
S20
A

FIG. 15

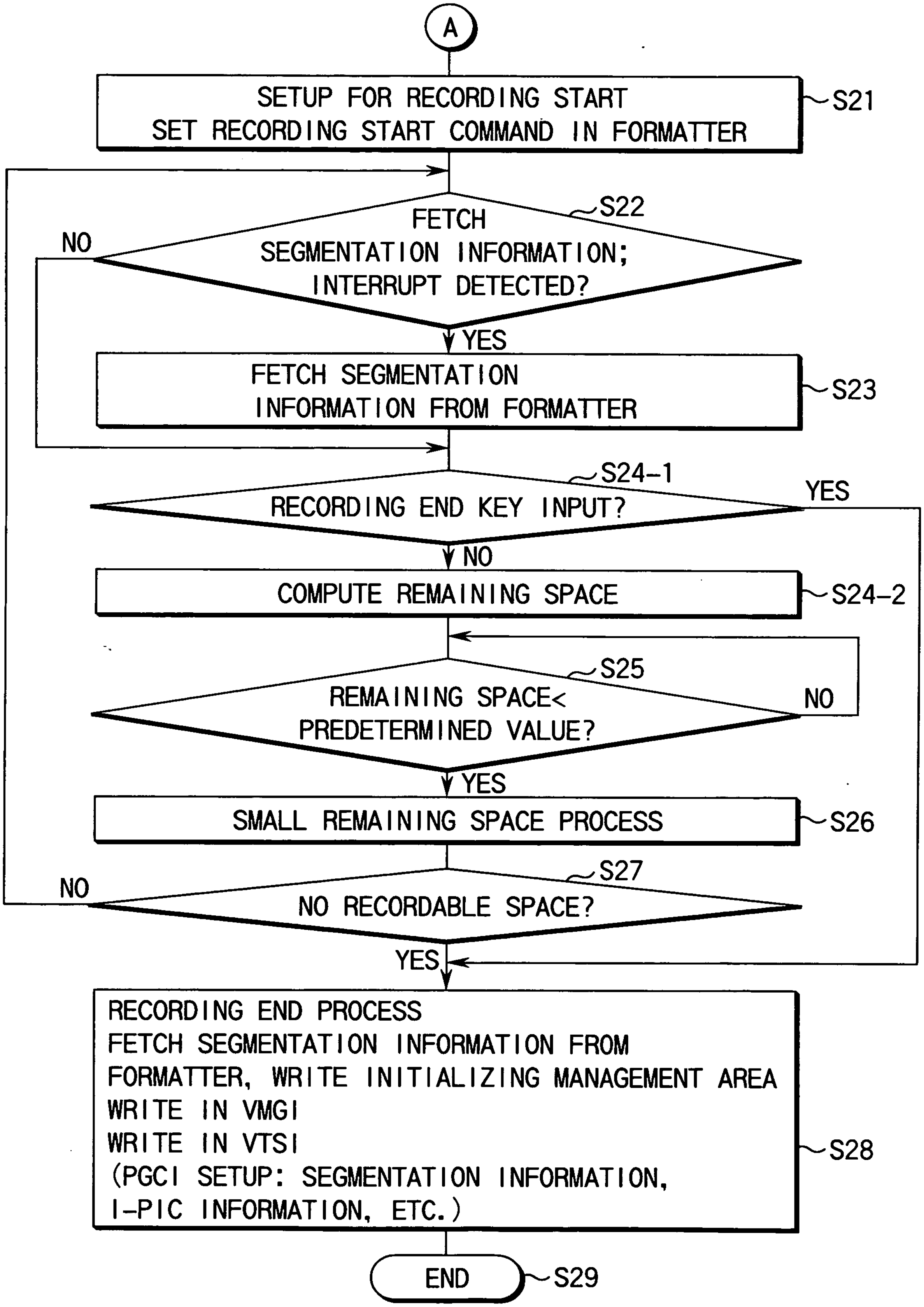
A
SETUP FOR RECORDING START
SET RECORDING START COMMAND IN FORMATTER
S21
FETCH SEGMENTATION INFORMATION; INTERRUPT DETECTED?
S22
NO
YES
FETCH SEGMENTATION INFORMATION FROM FORMATTER
S23
RECORDING END KEY INPUT?
S24-1
YES
NO
COMPUTE REMAINING SPACE
S24-2
REMAINING SPACE< PREDETERMINED VALUE?
S25
NO
YES
SMALL REMAINING SPACE PROCESS
S26
NO RECORDABLE SPACE?
S27
NO
YES
RECORDING END PROCESS
FETCH SEGMENTATION INFORMATION FROM FORMATTER, WRITE INITIALIZING MANAGEMENT AREA
WRITE IN VMGI
WRITE IN VTSI
(PGCI SETUP: SEGMENTATION INFORMATION, I-PIC INFORMATION, ETC.)
S28
END
S29

FIG. 16

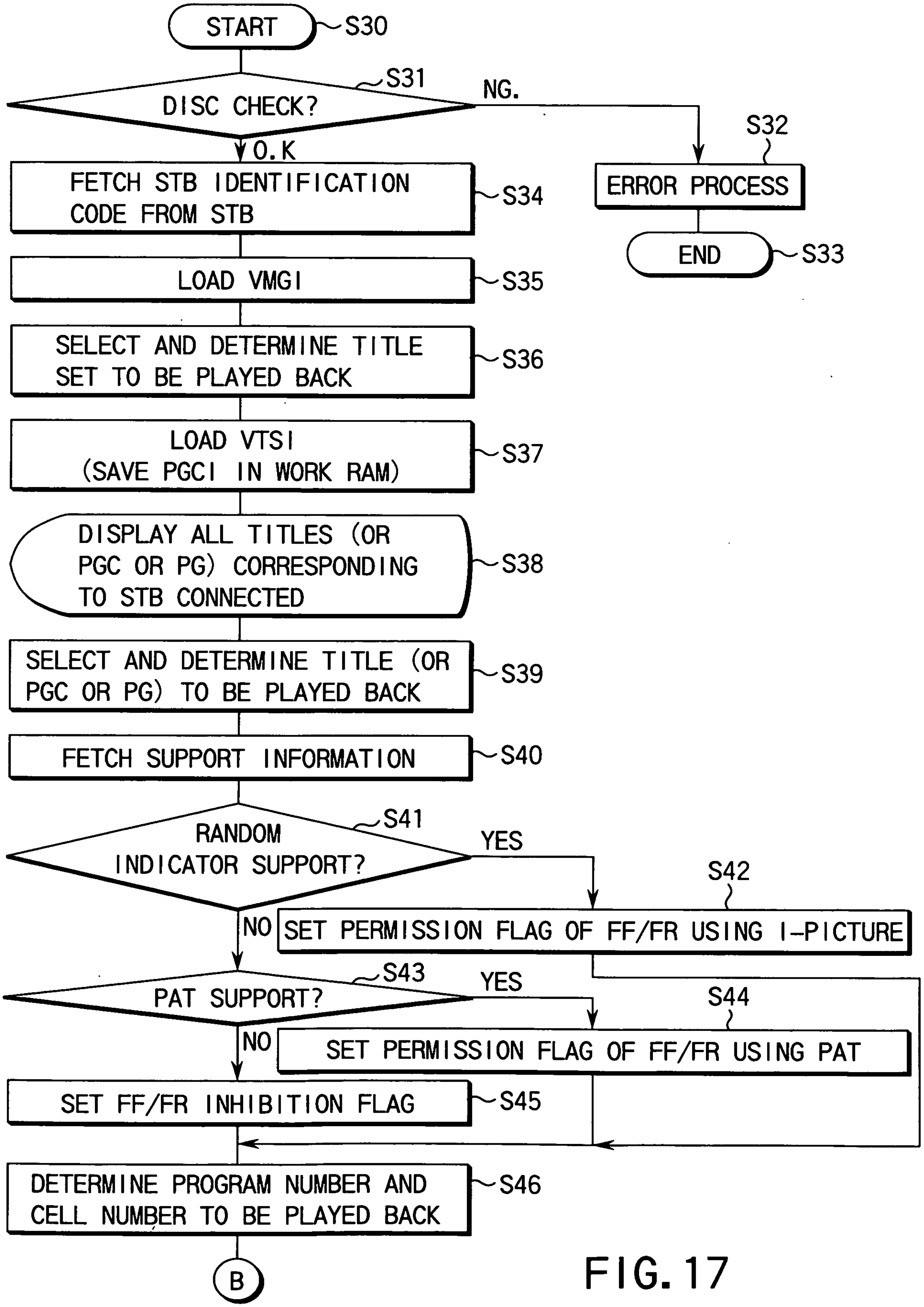
START
S30
DISC CHECK?
S31
NG.
O.K
S32
ERROR PROCESS
END
S33
FETCH STB IDENTIFICATION CODE FROM STB
S34
LOAD VMGI
S35
SELECT AND DETERMINE TITLE SET TO BE PLAYED BACK
S36
LOAD VTSI (SAVE PGCI IN WORK RAM)
S37
DISPLAY ALL TITLES (OR PGC OR PG) CORRESPONDING TO STB CONNECTED
S38
SELECT AND DETERMINE TITLE (OR PGC OR PG) TO BE PLAYED BACK
S39
FETCH SUPPORT INFORMATION
S40
RANDOM INDICATOR SUPPORT?
S41
YES
NO
S42
SET PERMISSION FLAG OF FF/FR USING I-PICTURE
PAT SUPPORT?
S43
YES
NO
S44
SET PERMISSION FLAG OF FF/FR USING PAT
SET FF/FR INHIBITION FLAG
S45
DETERMINE PROGRAM NUMBER AND CELL NUMBER TO BE PLAYED BACK
S46
B

FIG. 17

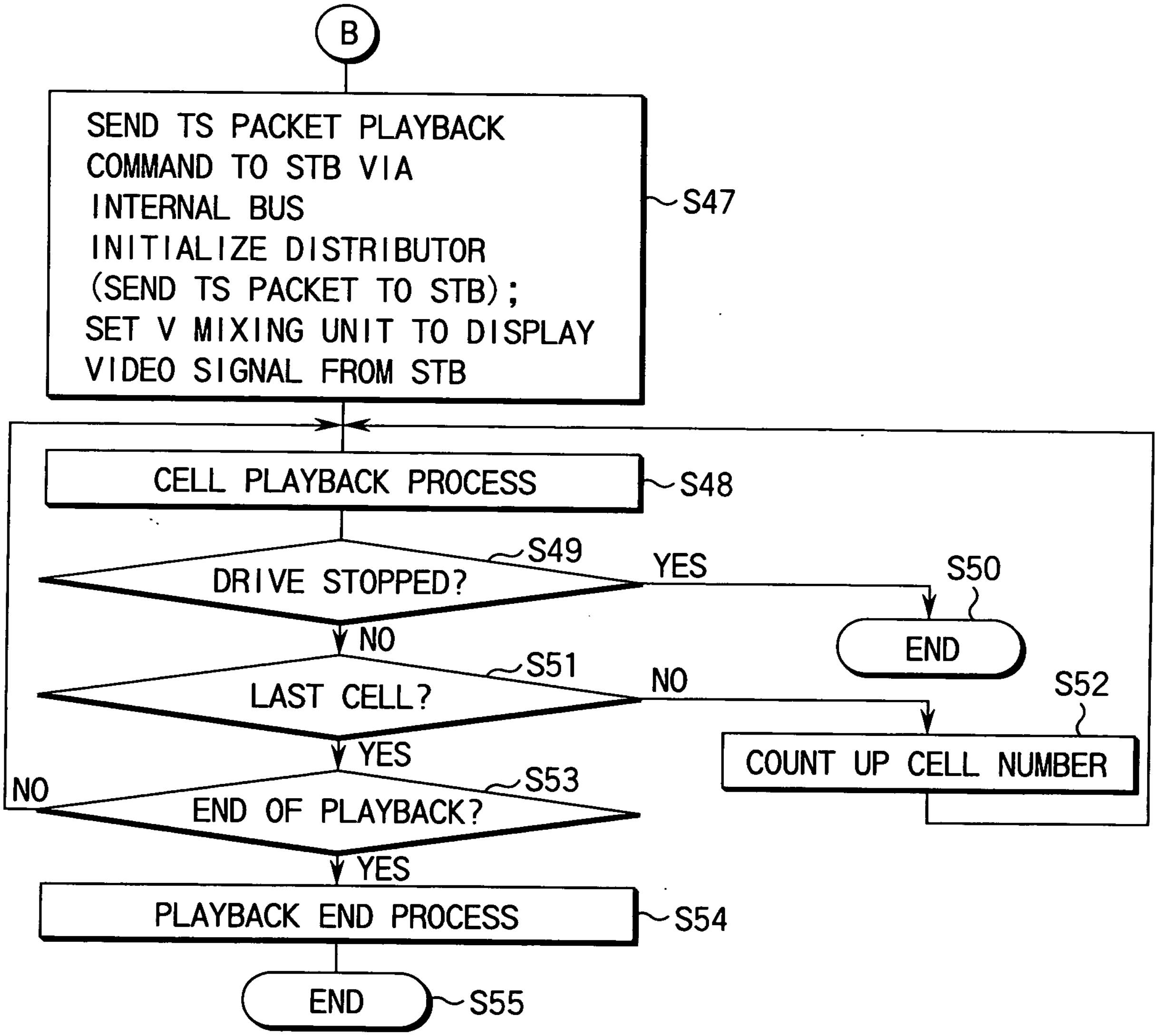
B
SEND TS PACKET PLAYBACK COMMAND TO STB VIA INTERNAL BUS
INITIALIZE DISTRIBUTOR (SEND TS PACKET TO STB);
SET V MIXING UNIT TO DISPLAY VIDEO SIGNAL FROM STB
S47
CELL PLAYBACK PROCESS
S48
DRIVE STOPPED?
S49
YES
S50
END
NO
LAST CELL?
S51
NO
S52
COUNT UP CELL NUMBER
YES
NO
END OF PLAYBACK?
S53
YES
PLAYBACK END PROCESS
S54
END
S55

FIG. 18

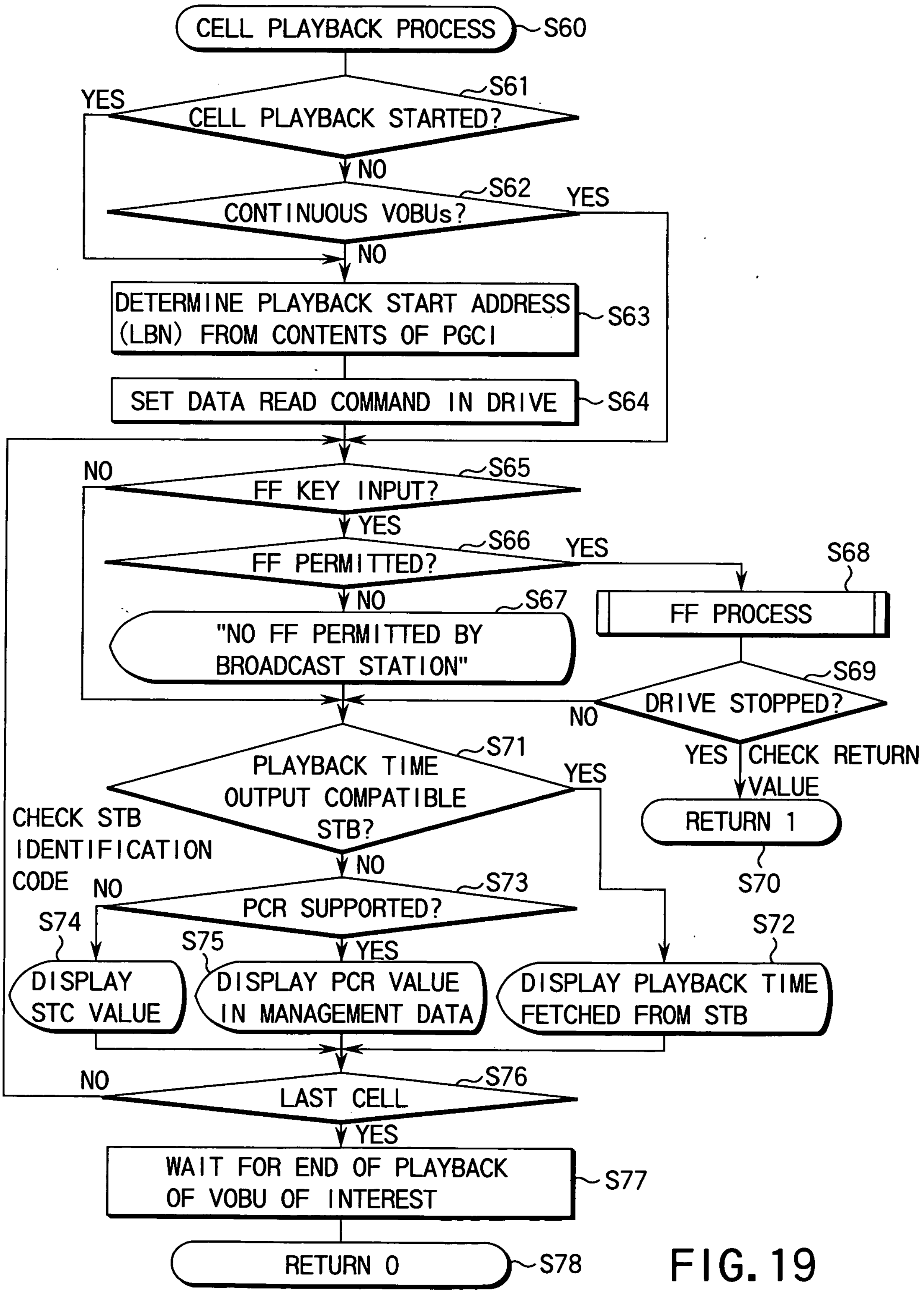
CELL PLAYBACK PROCESS
S60
CELL PLAYBACK STARTED?
S61
YES
NO
CONTINUOUS VOBUs?
S62
YES
NO
DETERMINE PLAYBACK START ADDRESS (LBN) FROM CONTENTS OF PGCI
S63
SET DATA READ COMMAND IN DRIVE
S64
FF KEY INPUT?
S65
NO
YES
FF PERMITTED?
S66
YES
NO
S68
FF PROCESS
"NO FF PERMITTED BY BROADCAST STATION"
S67
DRIVE STOPPED?
S69
NO
YES
CHECK RETURN VALUE
RETURN 1
S70
PLAYBACK TIME OUTPUT COMPATIBLE STB?
S71
YES
CHECK STB IDENTIFICATION CODE
NO
PCR SUPPORTED?
S73
NO
YES
S74
DISPLAY STC VALUE
S75
DISPLAY PCR VALUE IN MANAGEMENT DATA
S72
DISPLAY PLAYBACK TIME FETCHED FROM STB
LAST CELL
S76
NO
YES
WAIT FOR END OF PLAYBACK OF VOBU OF INTEREST
S77
RETURN 0
S78

FIG. 19

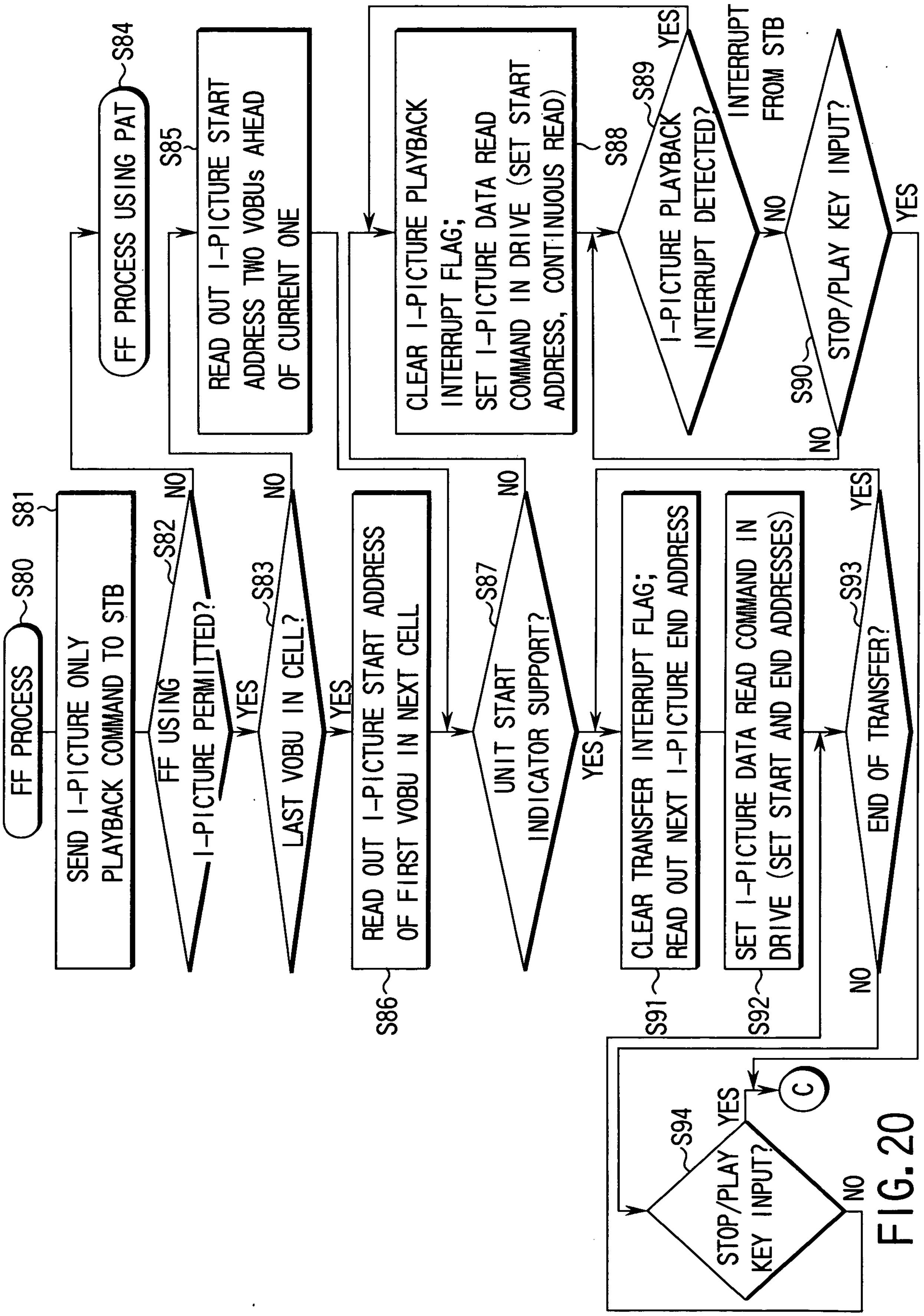
FF PROCESS
S80
SEND I-PICTURE ONLY PLAYBACK COMMAND TO STB
S81
FF USING I-PICTURE PERMITTED?
S82
YES
NO
LAST VOBU IN CELL?
S83
YES
NO
READ OUT I-PICTURE START ADDRESS OF FIRST VOBU IN NEXT CELL
S86
UNIT START INDICATOR SUPPORT?
S87
YES
NO
CLEAR TRANSFER INTERRUPT FLAG; READ OUT NEXT I-PICTURE END ADDRESS
S91
SET I-PICTURE DATA READ COMMAND IN DRIVE (SET START AND END ADDRESSES)
S92
END OF TRANSFER?
S93
YES
NO
STOP/PLAY KEY INPUT?
S94
YES
NO
C
FF PROCESS USING PAT
S84
READ OUT I-PICTURE START ADDRESS TWO VOBUs AHEAD OF CURRENT ONE
S85
CLEAR I-PICTURE PLAYBACK INTERRUPT FLAG; SET I-PICTURE DATA READ COMMAND IN DRIVE (SET START ADDRESS, CONTINUOUS READ)
S88
I-PICTURE PLAYBACK INTERRUPT DETECTED?
S89
YES
NO
INTERRUPT FROM STB
STOP/PLAY KEY INPUT?
S90
YES
NO

FIG. 20

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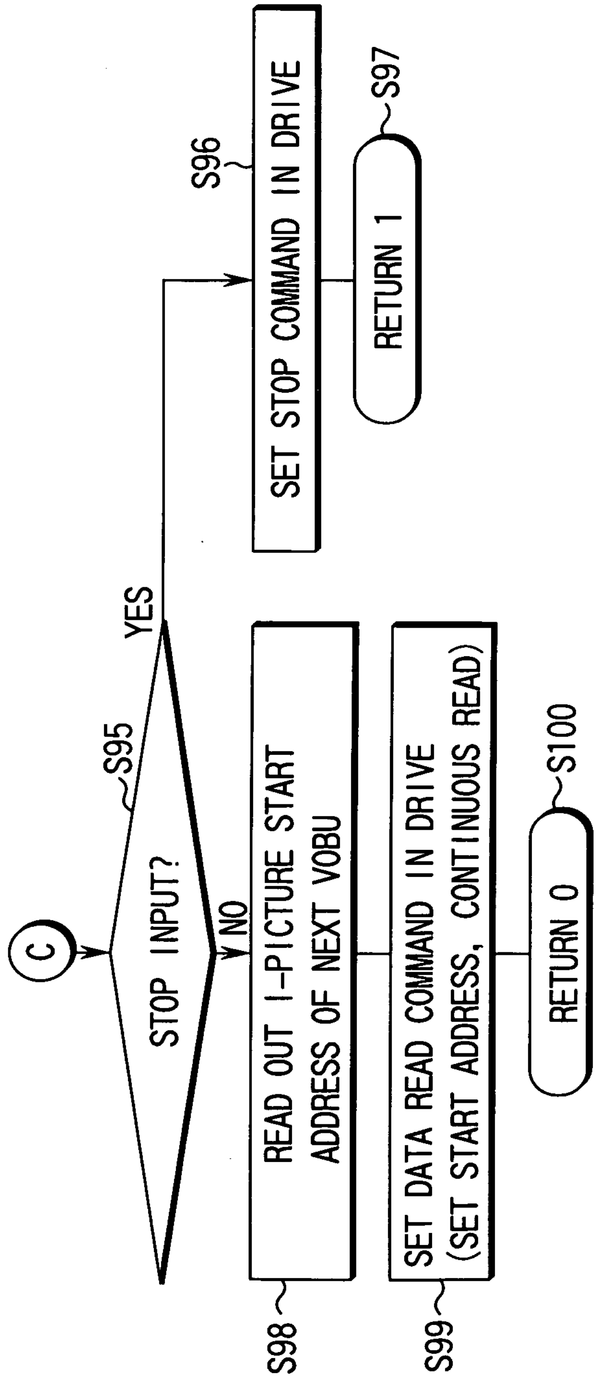
C
STOP INPUT?
S95
YES
NO
SET STOP COMMAND IN DRIVE
S96
RETURN 1
S97
READ OUT I-PICTURE START ADDRESS OF NEXT VOBU
S98
SET DATA READ COMMAND IN DRIVE (SET START ADDRESS, CONTINUOUS READ)
S99
RETURN 0
S100

FIG. 21

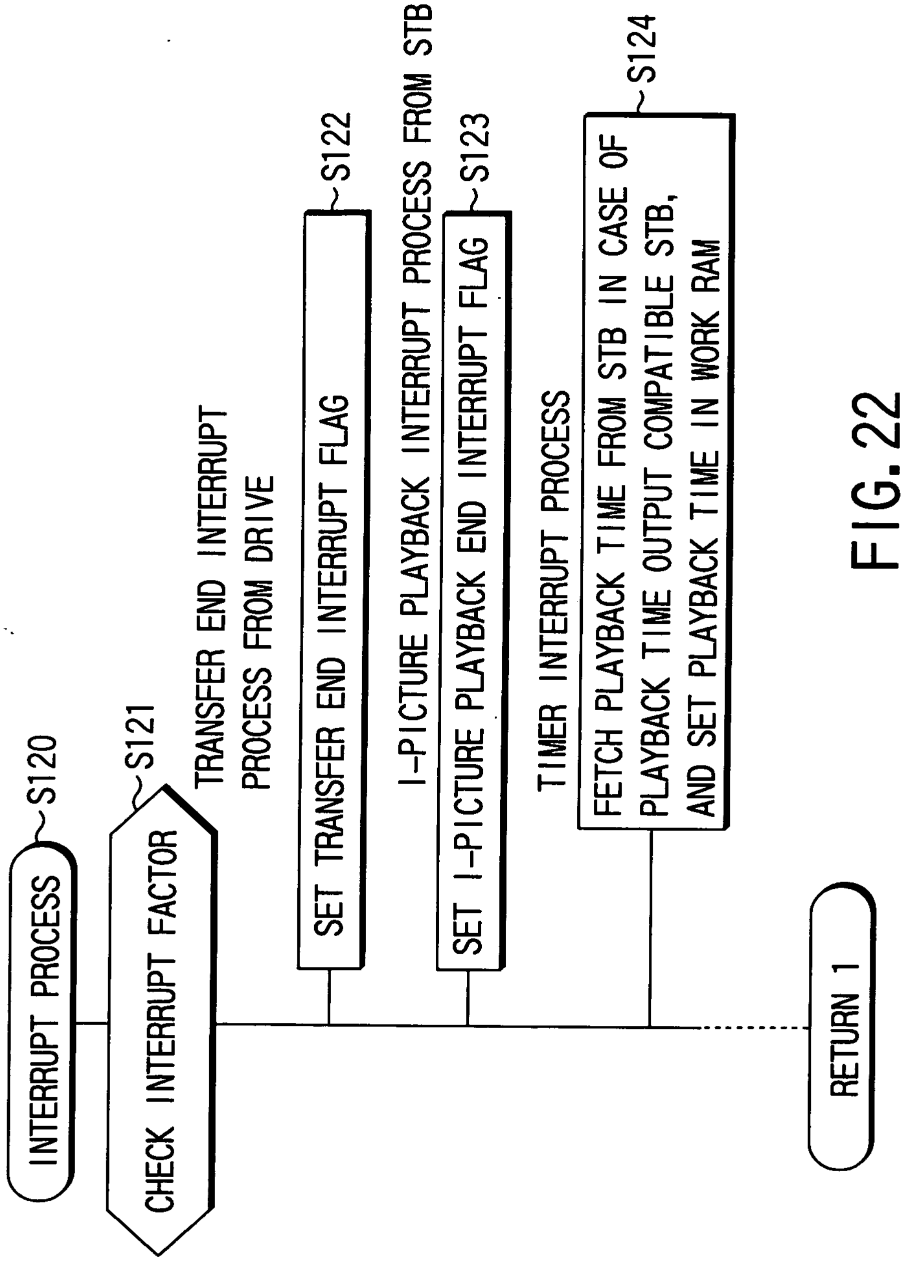
INTERRUPT PROCESS
S120
CHECK INTERRUPT FACTOR
S121
TRANSFER END INTERRUPT PROCESS FROM DRIVE
SET TRANSFER END INTERRUPT FLAG
S122
I-PICTURE PLAYBACK INTERRUPT PROCESS FROM STB
SET I-PICTURE PLAYBACK END INTERRUPT FLAG
S123
TIMER INTERRUPT PROCESS
FETCH PLAYBACK TIME FROM STB IN CASE OF PLAYBACK TIME OUTPUT COMPATIBLE STB, AND SET PLAYBACK TIME IN WORK RAM
S124
RETURN 1

FIG. 22

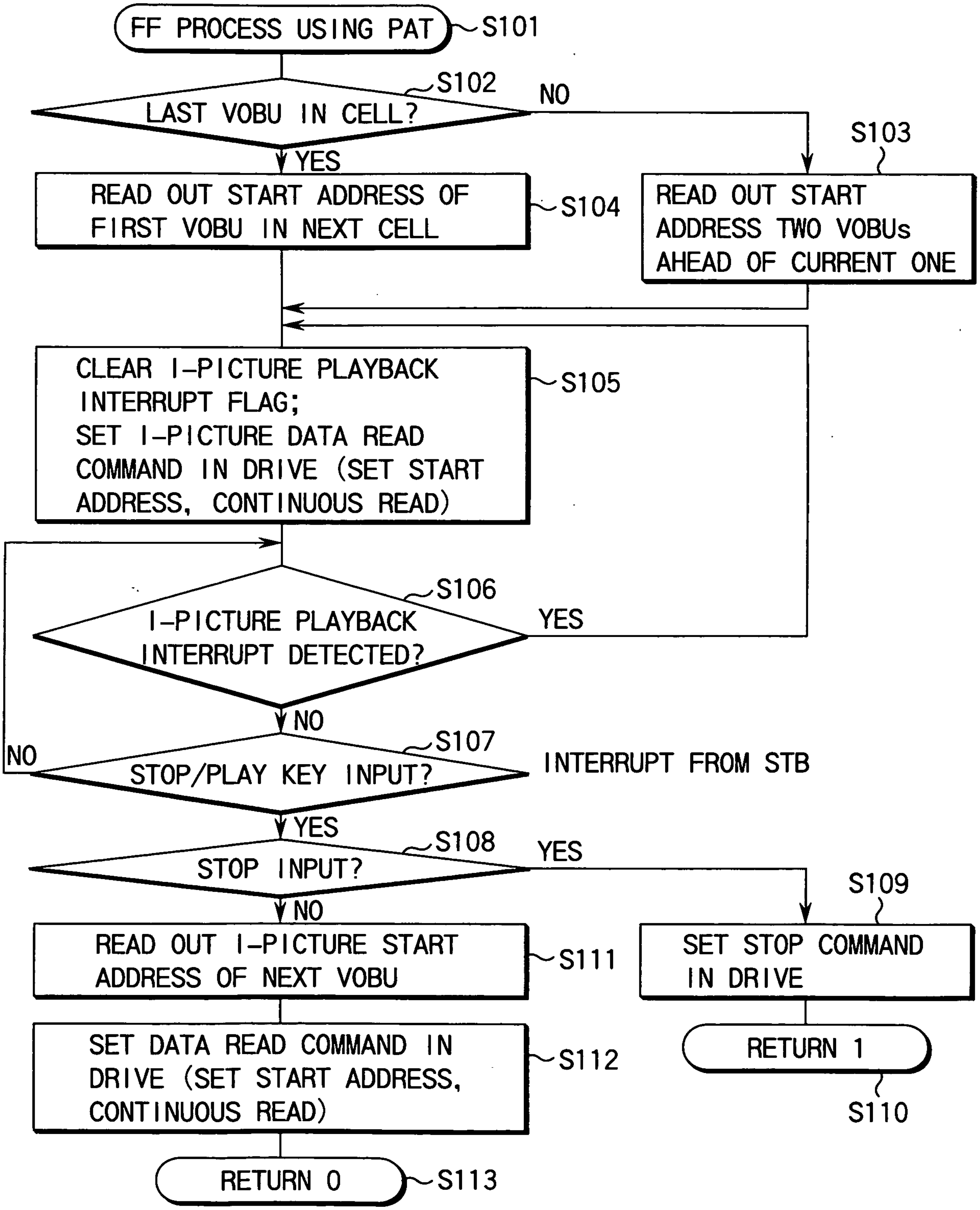
FF PROCESS USING PAT
S101
LAST VOBU IN CELL?
S102
NO
YES
S103
READ OUT START ADDRESS TWO VOBUs AHEAD OF CURRENT ONE
READ OUT START ADDRESS OF FIRST VOBU IN NEXT CELL
S104
CLEAR I-PICTURE PLAYBACK INTERRUPT FLAG; SET I-PICTURE DATA READ COMMAND IN DRIVE (SET START ADDRESS, CONTINUOUS READ)
S105
I-PICTURE PLAYBACK INTERRUPT DETECTED?
S106
YES
NO
STOP/PLAY KEY INPUT?
S107
NO
INTERRUPT FROM STB
YES
STOP INPUT?
S108
YES
NO
S109
SET STOP COMMAND IN DRIVE
RETURN 1
S110
READ OUT I-PICTURE START ADDRESS OF NEXT VOBU
S111
SET DATA READ COMMAND IN DRIVE (SET START ADDRESS, CONTINUOUS READ)
S112
RETURN 0
S113

FIG. 23

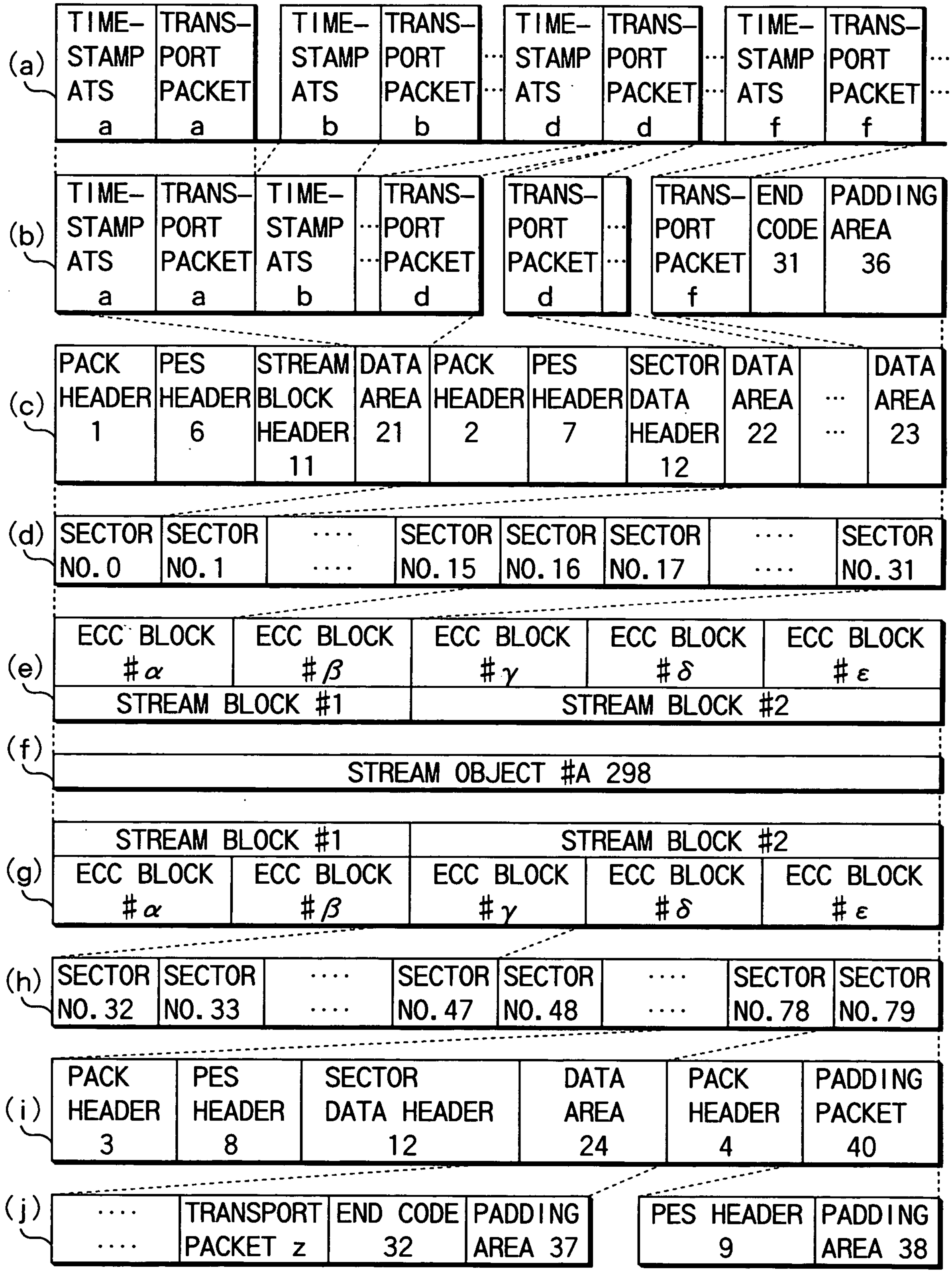
(a)
TIME-STAMP ATS a
TRANS-PORT PACKET a
TIME-STAMP ATS b
TRANS-PORT PACKET b
TIME-STAMP ATS d
TRANS-PORT PACKET d
TIME-STAMP ATS f
TRANS-PORT PACKET f
(b)
TIME-STAMP ATS a
TRANS-PORT PACKET a
TIME-STAMP ATS b
TRANS-PORT PACKET d
TRANS-PORT PACKET d
TRANS-PORT PACKET f
END CODE 31
PADDING AREA 36
(c)
PACK HEADER 1
PES HEADER 6
STREAM BLOCK HEADER 11
DATA AREA 21
PACK HEADER 2
PES HEADER 7
SECTOR DATA HEADER 12
DATA AREA 22
DATA AREA 23
(d)
SECTOR NO. 0
SECTOR NO. 1
SECTOR NO. 15
SECTOR NO. 16
SECTOR NO. 17
SECTOR NO. 31
(e)
ECC BLOCK #α
ECC BLOCK #β
ECC BLOCK #γ
ECC BLOCK #δ
ECC BLOCK #ε
STREAM BLOCK #1
STREAM BLOCK #2
(f)
STREAM OBJECT #A 298
(g)
STREAM BLOCK #1
STREAM BLOCK #2
ECC BLOCK #α
ECC BLOCK #β
ECC BLOCK #γ
ECC BLOCK #δ
ECC BLOCK #ε
(h)
SECTOR NO. 32
SECTOR NO. 33
SECTOR NO. 47
SECTOR NO. 48
SECTOR NO. 78
SECTOR NO. 79
(i)
PACK HEADER 3
PES HEADER 8
SECTOR DATA HEADER 12
DATA AREA 24
PACK HEADER 4
PADDING PACKET 40
(j)
TRANSPORT PACKET z
END CODE 32
PADDING AREA 37
PES HEADER 9
PADDING AREA 38

FIG. 24

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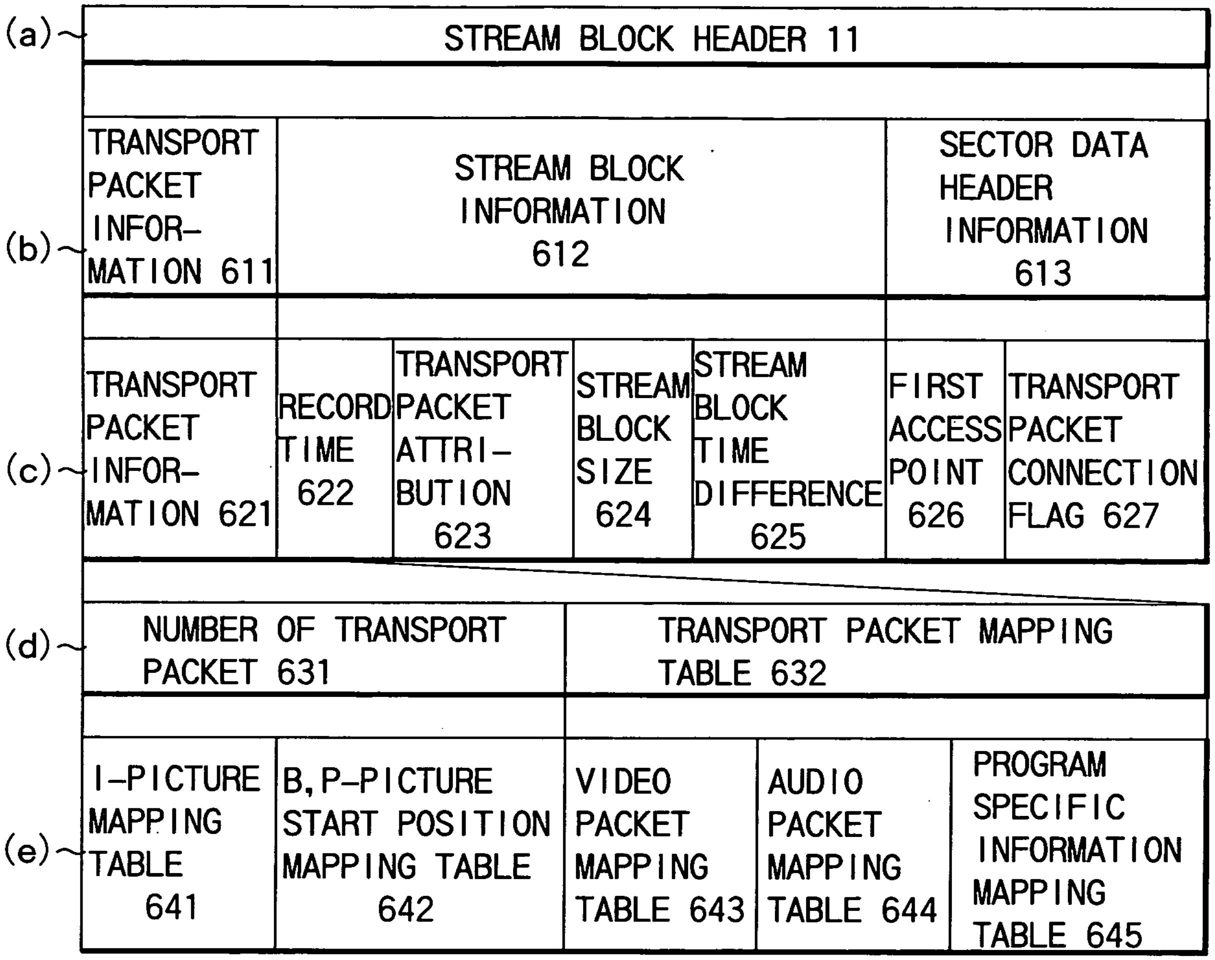
(a)
STREAM BLOCK HEADER 11
(b)
TRANSPORT PACKET INFORMATION 611
STREAM BLOCK INFORMATION 612
SECTOR DATA HEADER INFORMATION 613
(c)
TRANSPORT PACKET INFORMATION 621
RECORD TIME 622
TRANSPORT PACKET ATTRIBUTION 623
STREAM BLOCK SIZE 624
STREAM BLOCK TIME DIFFERENCE 625
FIRST ACCESS POINT 626
TRANSPORT PACKET CONNECTION FLAG 627
(d)
NUMBER OF TRANSPORT PACKET 631
TRANSPORT PACKET MAPPING TABLE 632
(e)
I-PICTURE MAPPING TABLE 641
B, P-PICTURE START POSITION MAPPING TABLE 642
VIDEO PACKET MAPPING TABLE 643
AUDIO PACKET MAPPING TABLE 644
PROGRAM SPECIFIC INFORMATION MAPPING TABLE 645

FIG. 25

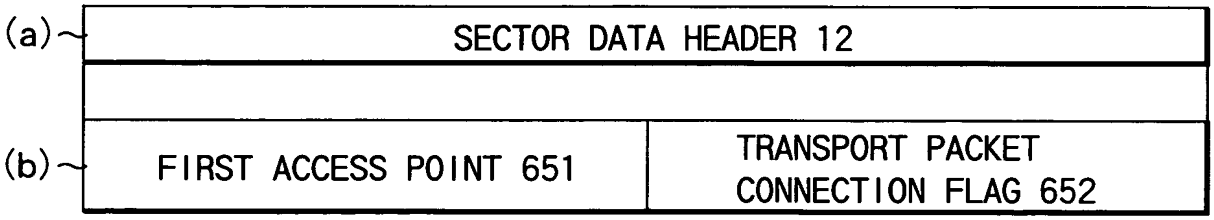
(a)
SECTOR DATA HEADER 12
(b)
FIRST ACCESS POINT 651
TRANSPORT PACKET CONNECTION FLAG 652

FIG. 26

CONSTRAINTS ON MPEG SPECIFICATIONS FOR SOB

| | |
|---|---|
| SYSTEM HEADER | SHALL NOT BE INCLUDED |
| SCR VALUE IN THE FIRST PACK OF A SOB | ANY VALUE |
| MPEG PROGRAM_END_CODE | SHALL NOT BE INCLUDED |
| STREAM_ID | SHALL BE EQUAL TO BFh (PRIVATE_STREAM_2) IN ALL PES PACKETS |

FIG. 27

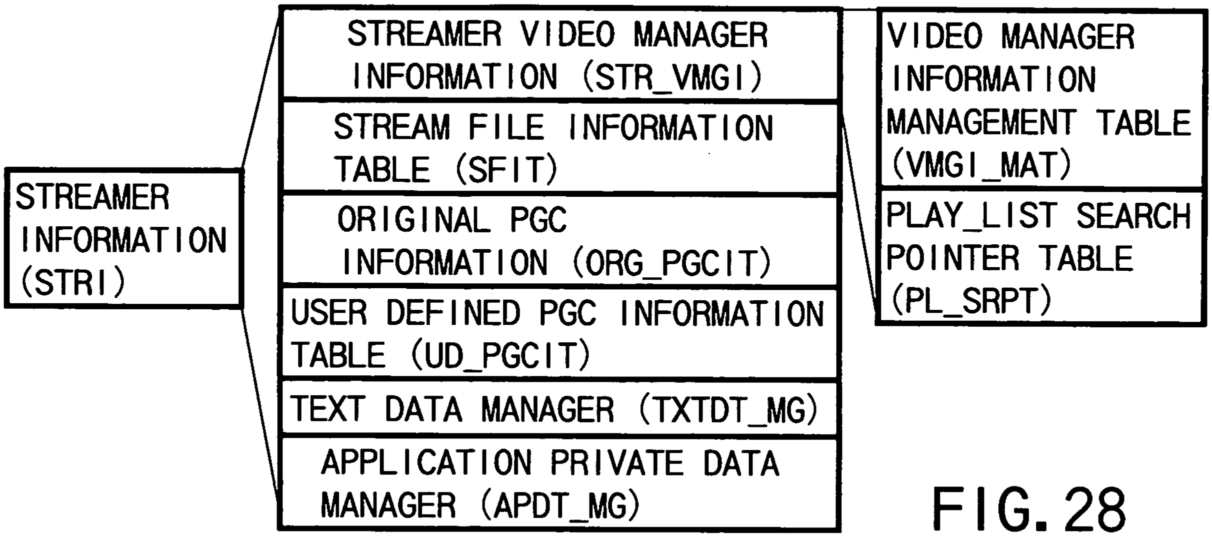
STREAMER INFORMATION (STRI)
STREAMER VIDEO MANAGER INFORMATION (STR_VMGI)
STREAM FILE INFORMATION TABLE (SFIT)
ORIGINAL PGC INFORMATION (ORG_PGCIT)
USER DEFINED PGC INFORMATION TABLE (UD_PGCIT)
TEXT DATA MANAGER (TXTDT_MG)
APPLICATION PRIVATE DATA MANAGER (APDT_MG)
VIDEO MANAGER INFORMATION MANAGEMENT TABLE (VMGI_MAT)
PLAY_LIST SEARCH POINTER TABLE (PL_SRPT)

FIG. 28

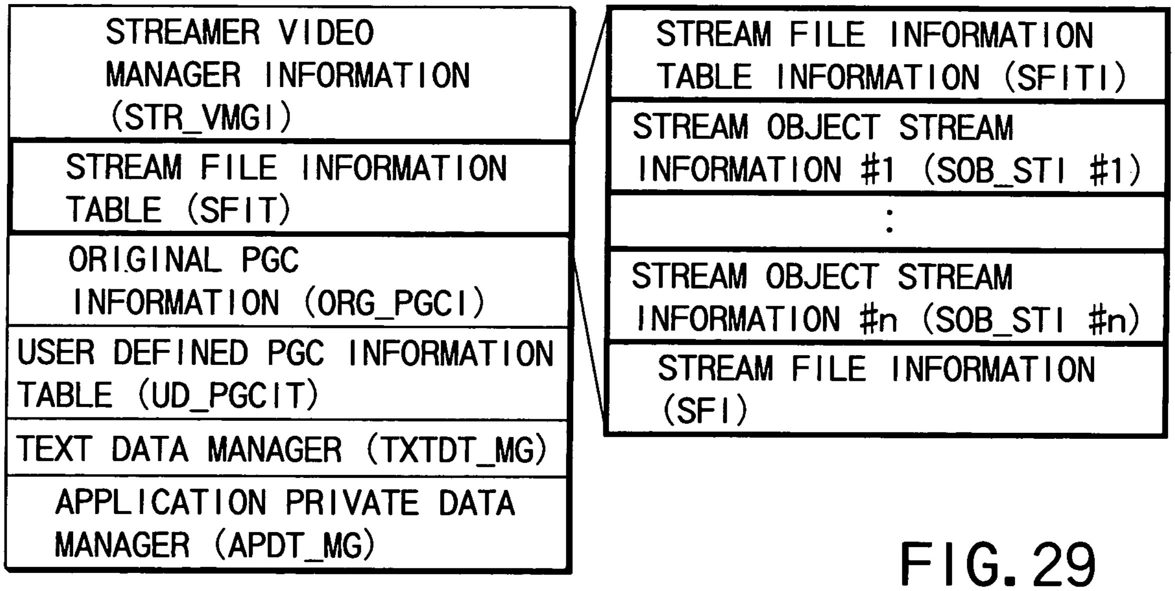
STREAMER VIDEO MANAGER INFORMATION (STR_VMGI)
STREAM FILE INFORMATION TABLE (SFIT)
ORIGINAL PGC INFORMATION (ORG_PGCI)
USER DEFINED PGC INFORMATION TABLE (UD_PGCIT)
TEXT DATA MANAGER (TXTDT_MG)
APPLICATION PRIVATE DATA MANAGER (APDT_MG)
STREAM FILE INFORMATION TABLE INFORMATION (SFITI)
STREAM OBJECT STREAM INFORMATION #1 (SOB_STI #1)
:
STREAM OBJECT STREAM INFORMATION #n (SOB_STI #n)
STREAM FILE INFORMATION (SFI)

FIG. 29

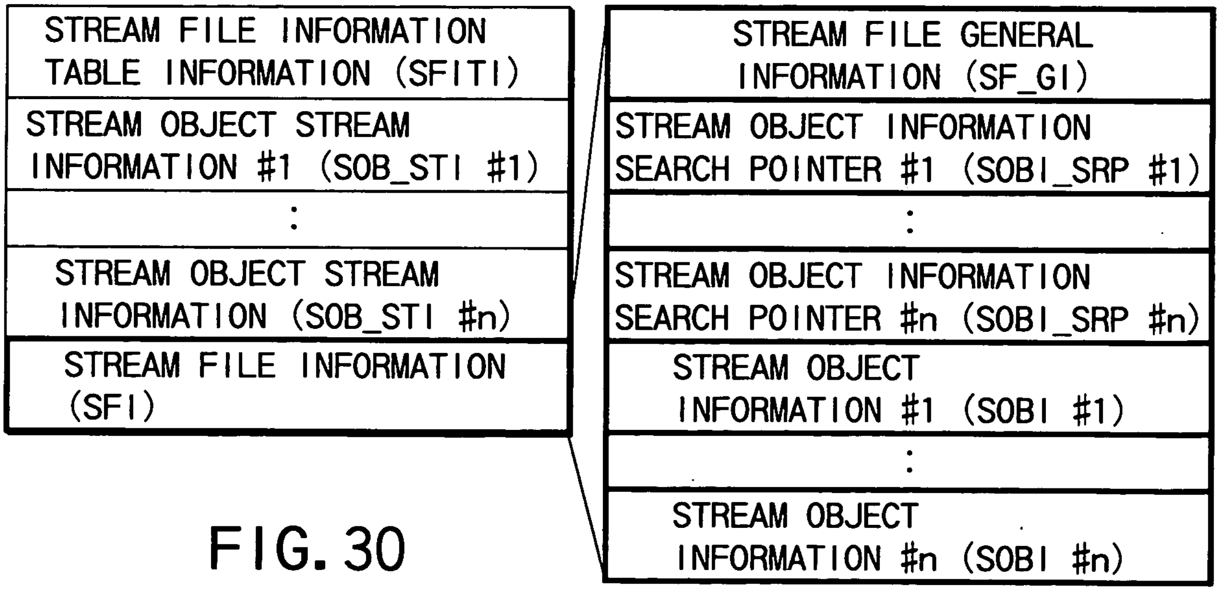
STREAM FILE INFORMATION TABLE INFORMATION (SFITI)
STREAM OBJECT STREAM INFORMATION #1 (SOB_STI #1)
:
STREAM OBJECT STREAM INFORMATION (SOB_STI #n)
STREAM FILE INFORMATION (SFI)
STREAM FILE GENERAL INFORMATION (SF_GI)
STREAM OBJECT INFORMATION SEARCH POINTER #1 (SOBI_SRP #1)
:
STREAM OBJECT INFORMATION SEARCH POINTER #n (SOBI_SRP #n)
STREAM OBJECT INFORMATION #1 (SOBI #1)
:
STREAM OBJECT INFORMATION #n (SOBI #n)

FIG. 30

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STREAM FILE GENERAL INFORMATION (SF_GI)

| | CONTENTS | NUMBER OF BYTES |
|---|---|---|
| (1) SOBI_Ns | NUMBER OF SOBIs | 2 |
| (2) SOBU_SIZ | NUMBER OF SECTORS PER SOBU | 2 |
| (3) MTU_SHFT | MAPPING TIME UNIT SHIFT | 1 |
| (4) RESERVED | RESERVED | 1 |
| | TOTAL | 6 |

FIG. 31

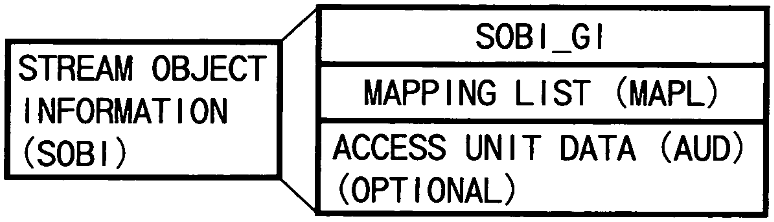
STREAM OBJECT INFORMATION (SOBI)
SOBI_GI
MAPPING LIST (MAPL)
ACCESS UNIT DATA (AUD) (OPTIONAL)

FIG. 32

STREAM OBJECT INFORMATION GENERAL INFORMATION (SOBI_GI)

| | CONTENTS | NUMBER OF BYTES |
|---|---|---|
| (1) SOB_TY | SOB TYPE | 1 |
| (2) SOB_REC_TM | SOB RECORDING TIME | 5 |
| (3) SOB_STI_N | SOB STREAM INFORMATION NUMBER | 1 |
| (4) AUD_FLAGS | ACCESS UNIT DATA FLAGS | 1 |
| (5) SOB_S_APAT | SOB START APAT | 6 |
| (6) SOB_E_APAT | SOB END APAT | 6 |
| (7) SOB_S_SOBU | FIRST SOBU OF THIS SOB | 4 |
| (8) MAPL_ENT_Ns | NUMBER OF MAPPING LIST ENTRIES | 4 |
| | TOTAL | 28 |

FIG. 33

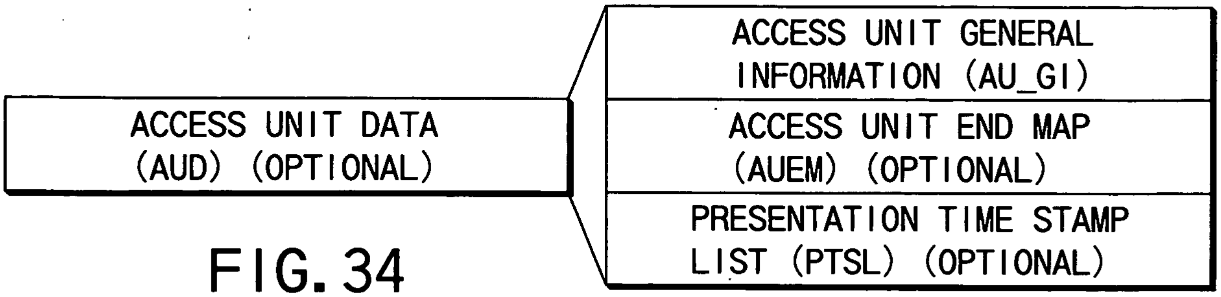
ACCESS UNIT DATA (AUD) (OPTIONAL)
ACCESS UNIT GENERAL INFORMATION (AU_GI)
ACCESS UNIT END MAP (AUEM) (OPTIONAL)
PRESENTATION TIME STAMP LIST (PTSL) (OPTIONAL)

FIG. 34

ACCESS UNIT GENERAL INFORMATION (AU_GI)

| | CONTENTS | NUMBER OF BYTES |
|---|---|---|
| (1) AU_Ns | NUMBER OF ACCESS UNITS | 4 |
| (2) AUSM | ACCESS UNIT START MAP (MAP_ENT_Ns ELEMENTS) | (MAPL_ENT_Ns+7) div 8 |
| | TOTAL | (MAPL_ENT_Ns+7) div 8 + 4 |

FIG. 35

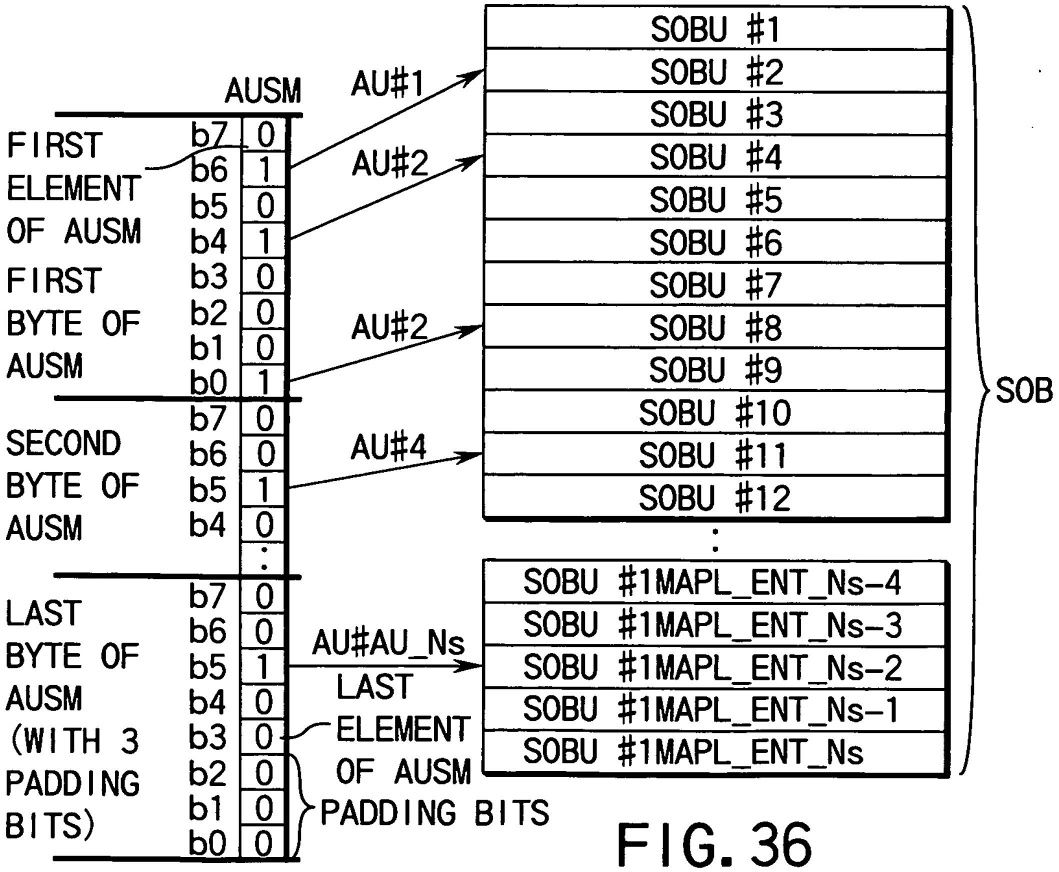
AUSM
FIRST ELEMENT OF AUSM
FIRST BYTE OF AUSM
SECOND BYTE OF AUSM
LAST BYTE OF AUSM (WITH 3 PADDING BITS)
b7 0
b6 1
b5 0
b4 1
b3 0
b2 0
b1 0
b0 1
b7 0
b6 0
b5 1
b4 0
b7 0
b6 0
b5 1
b4 0
b3 0
b2 0
b1 0
b0 0
AU#1
AU#2
AU#2
AU#4
AU#AU_Ns
LAST ELEMENT OF AUSM
PADDING BITS
SOBU #1
SOBU #2
SOBU #3
SOBU #4
SOBU #5
SOBU #6
SOBU #7
SOBU #8
SOBU #9
SOBU #10
SOBU #11
SOBU #12
SOBU #1MAPL_ENT_Ns-4
SOBU #1MAPL_ENT_Ns-3
SOBU #1MAPL_ENT_Ns-2
SOBU #1MAPL_ENT_Ns-1
SOBU #1MAPL_ENT_Ns
SOB

FIG. 36

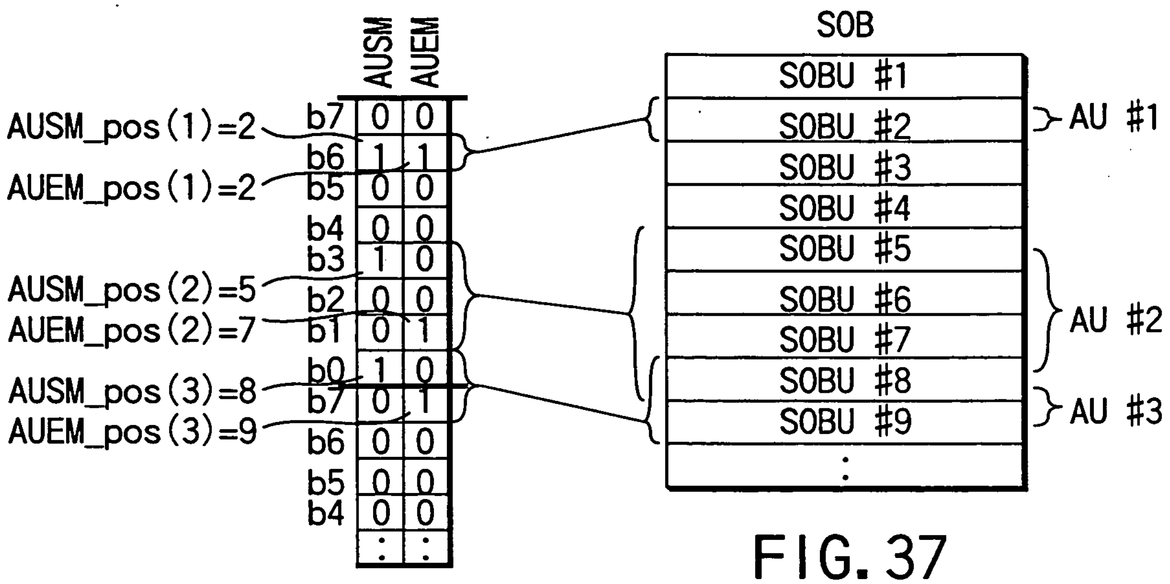
SOB
AUSM
AUEM
AUSM_pos(1)=2
AUEM_pos(1)=2
AUSM_pos(2)=5
AUEM_pos(2)=7
AUSM_pos(3)=8
AUEM_pos(3)=9
b7 0 0
b6 1 1
b5 0 0
b4 0 0
b3 1 0
b2 0 0
b1 0 1
b0 1 0
b7 0 1
b6 0 0
b5 0 0
b4 0 0
SOBU #1
SOBU #2
SOBU #3
SOBU #4
SOBU #5
SOBU #6
SOBU #7
SOBU #8
SOBU #9
AU #1
AU #2
AU #3

FIG. 37

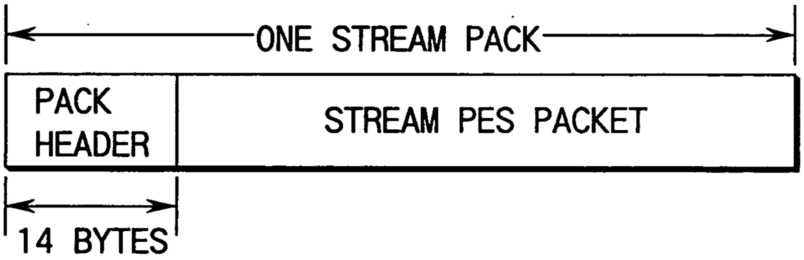
ONE STREAM PACK
PACK HEADER
STREAM PES PACKET
14 BYTES

FIG. 38

STRUCTURE OF THE STREAM DATA AREA WITHIN A STREAM PES PACKET

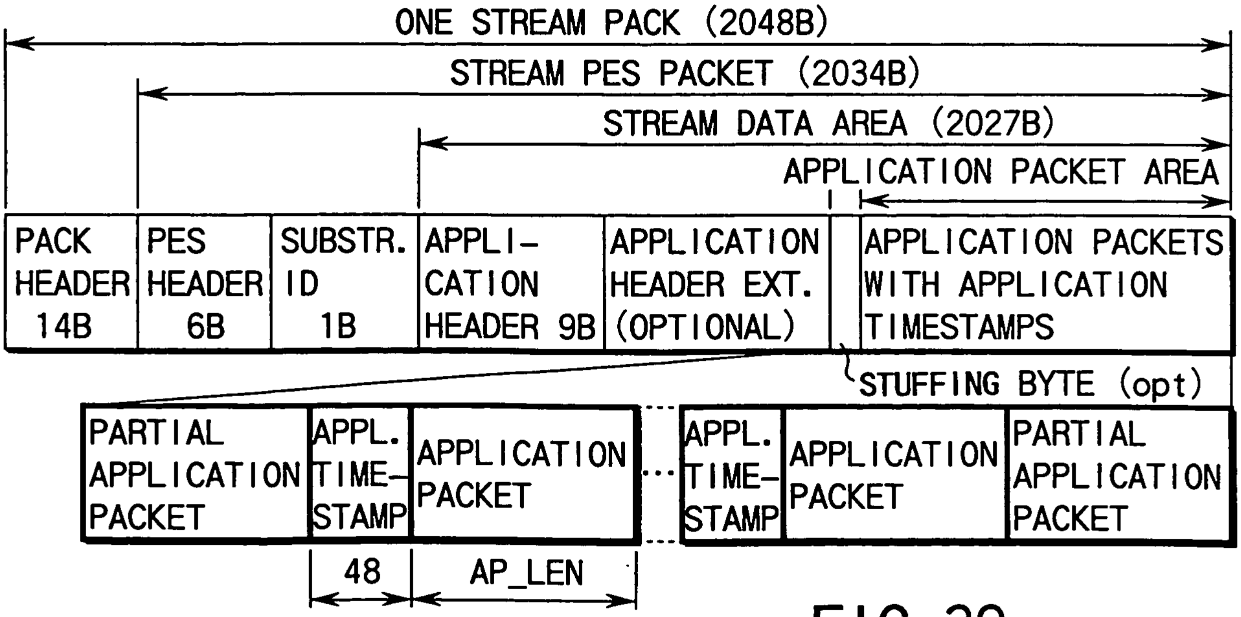
ONE STREAM PACK (2048B)
STREAM PES PACKET (2034B)
STREAM DATA AREA (2027B)
APPLICATION PACKET AREA
PACK HEADER 14B
PES HEADER 6B
SUBSTR. ID 1B
APPLI-CATION HEADER 9B
APPLICATION HEADER EXT. (OPTIONAL)
APPLICATION PACKETS WITH APPLICATION TIMESTAMPS
STUFFING BYTE (opt)
PARTIAL APPLICATION PACKET
APPL. TIME-STAMP
APPLICATION PACKET
APPL. TIME-STAMP
APPLICATION PACKET
PARTIAL APPLICATION PACKET
48
AP_LEN

FIG. 39

APPLICATION HEADER

| FIELD | NUMBER OF BITS | NUMBER OF BYTES | VALUE | COMMENT |
|---|---|---|---|---|
| (1) VERSION | 8 | 1 | 01h | |
| (2) AP_Ns | 8 | 1 | | |
| (3) FIRST_AP_OFFSET | 16 | 2 | | |
| (4) EXTENSION_HEADER_INFO | 2 | 1 | 00b, 10b, 11b | |
| (5) RESERVED FOR CCI_ESC | 1 | | 0b OR 1b | |
| (6) RESERVED | 5 | | 11111b | |
| (7) SERVICE_ID | 16 | 2 | | |
| (8) MAX_BR_LOG2 | 8 | 1 | | |
| (9) SMO_BS_LOG2 | 8 | 1 | | |
| | TOTAL | 9 | | |

FIG. 40